COPY FOR GEN. C.H. MITCHELL

HYDRO-ELECTRIC INQUIRY COMMISSION

ENGINEERING DATA

THE QUEENSTON-CHIPPAWA POWER DEVELOPMENT

CHAPTER "F"—ORGANIZATION

WALTER J. FRANCIS & COMPANY
CONSULTING ENGINEERS
MONTREAL

CHAPTER "F".

ORGANIZATION.

Walter F. Francis.

INDEX TO CHAPTER "F".

INDEX TO CHARTS "A".

Subject. Page.

COPY

Chapter F.

ORGANIZATION.

Walter J. Francis.

The whole of the Queenston-Chippawa Power Development work was done under the direction of an organization composed of the officers, staff members and assistants of the Hydro-Electric Power Commission of Ontario. At the commencement of the work an organization was formed along definite lines and was later extended as the necessity arose.

In studying the organization I have used the records of the work both at the Toronto and at the Niagara offices, and I have conferred freely with Mr. Gaby, Mr. Acres and other members of the staff. I have also enlisted the aid of Messrs. Price, Waterhouse and Co., through Mr. Landis.

Although diagrams of the organization have been prepared from time to time by the Engineers of the Hydro-Electric Power Commission, it does not seem necessary to discuss the details of the various steps in the evolution of the final organization. The subject will be dealt with as a whole, a note being made of important changes as the reference to the several principal offices is made.

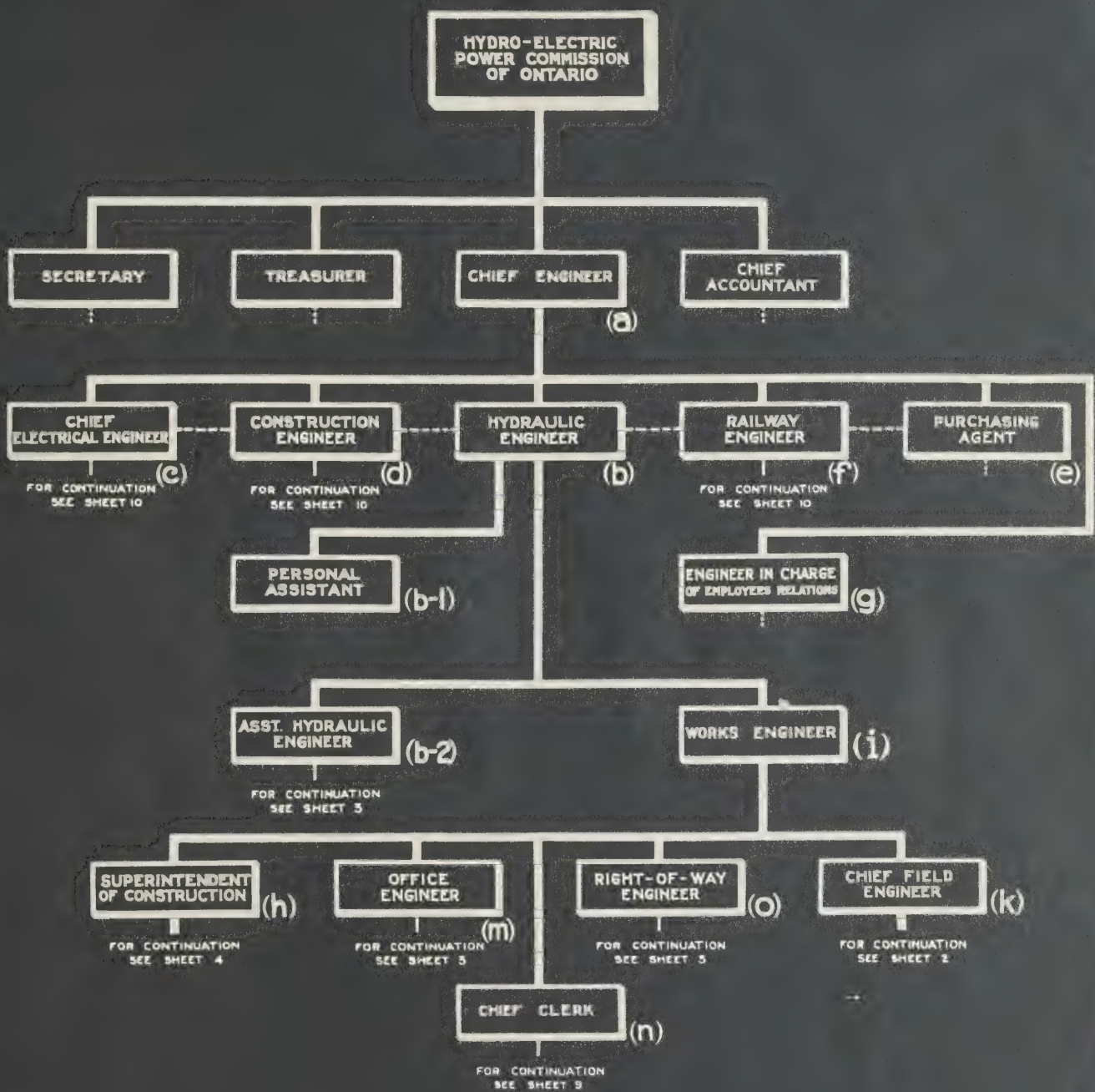
The present discussion will be confined solely to the organization which carried on the Queenston-Chippawa Power Development work, and the subject will be

dealt with in the following order:- the organization and the functions of its principal departments; the personnel of the organization in regard to the principal departments; and the remuneration attached to the several principal positions. In conclusion, a reference is made to Co-operation.

While the whole of the field staff will be embraced in this Chapter, the Head Office organization of the Hydro-Electric Power Commission at Toronto will now be referred to only in regard to its relation to the Queenston-Chippawa Power Development. The Accounting Department will be dealt with later, in co-operation with Messrs. Price, Waterhouse & Company.

The Organization.

For convenience of reference I have depicted the organization in graphical form on the charts included herewith as pages F-3 to F-12 inclusive. These charts have been prepared to conform to the information furnished to me by the various departments. The first sheet of the series shows the system of the organization from the Hydro-Electric Power Commission down to the heads of the various departments connected with the Queenston-Chippawa Power Development. The details of the organization in the various departments are given fully on the subsequent charts, with suitable cross references so that the relationship between any one part of the organization and any other part may be traced readily. For convenience of reference, between the chart and the various tables included herewith, letters have been attached to the principal offices in the organization, as for example, the Chief Engineer with the reference letter (a). The arrangement of the letters, however, does not necessarily give any indication of the relative importance of the various positions, but is included simply as a convenient method of reference in using the charts and the text.



HYDRO-ELECTRIC INQUIRY COMMISSION

W. D. GREGORY-CHAIRMAN

QUEENSTON-CHIPPAWA POWER DEVELOPMENT

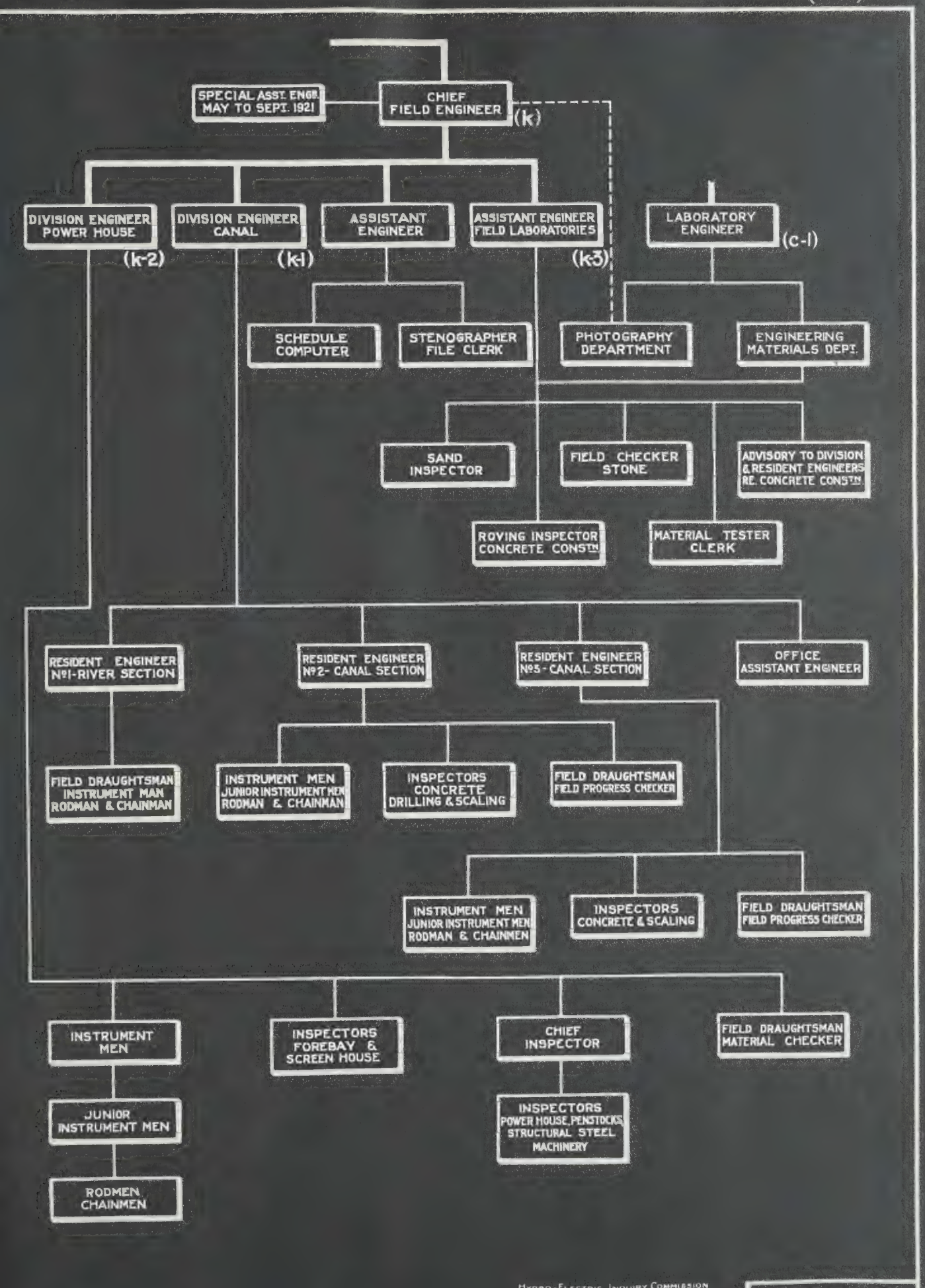
CHART SHOWING ORGANIZATION FOR QUEENSTON-CHIPPAWA POWER DEVELOPMENT

(SHEET 1 OF A SERIES OF 10 SHEETS)

Toronto, Sept. 4th 1922 Made by [illegible] Checked by [illegible]

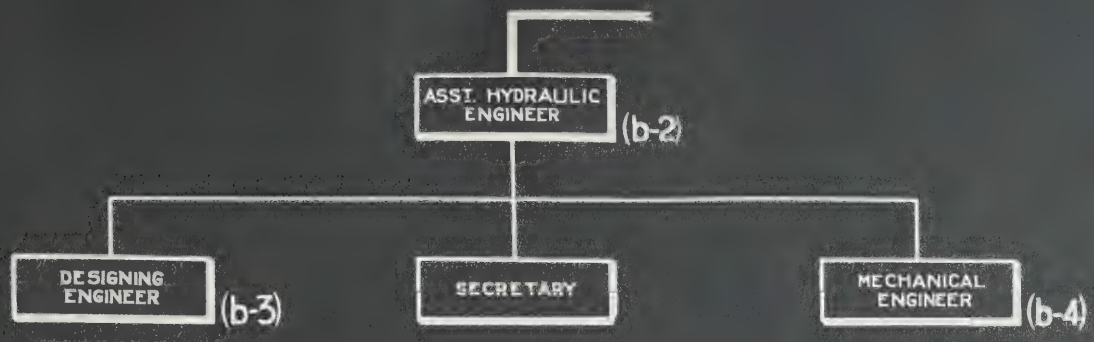
WALTER J. FRANCIS, C.E.,

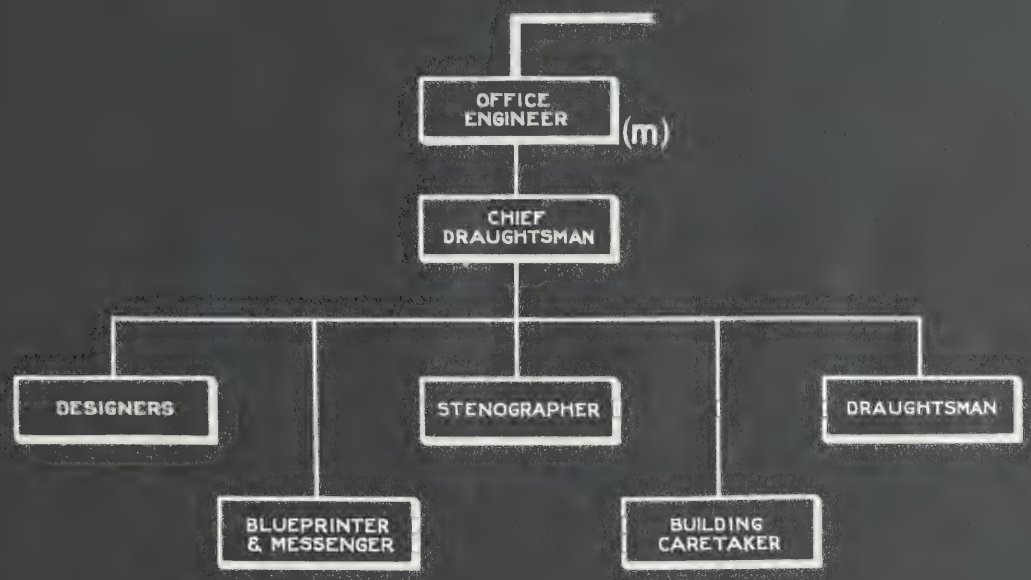
CONSULTING ENGINEER

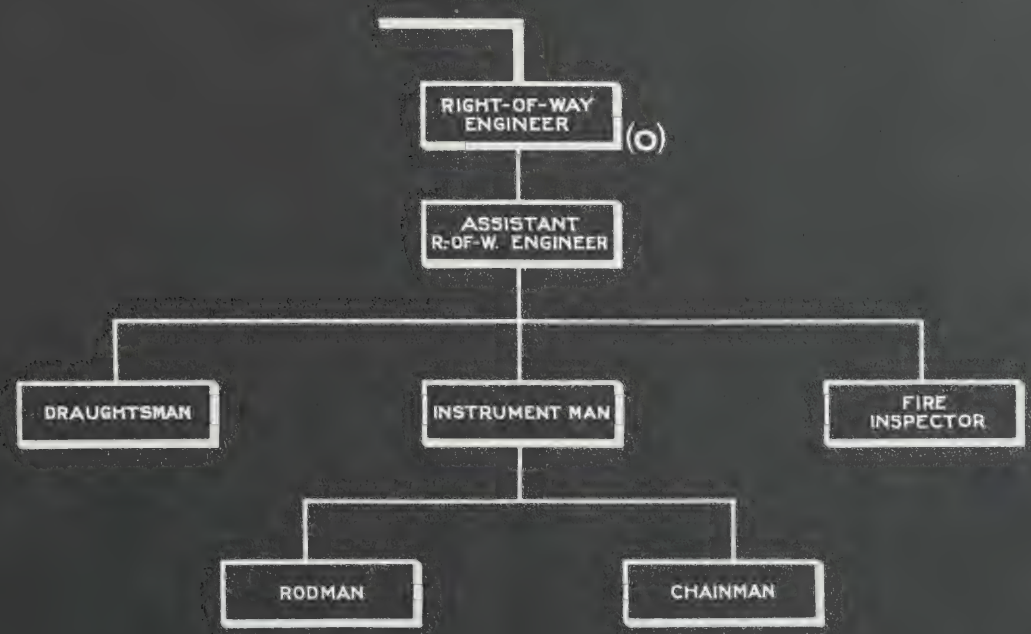


HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS, C.E., CONSULTING ENGINEER
TORONTO SEPT. 4TH 1922

SHEET 2







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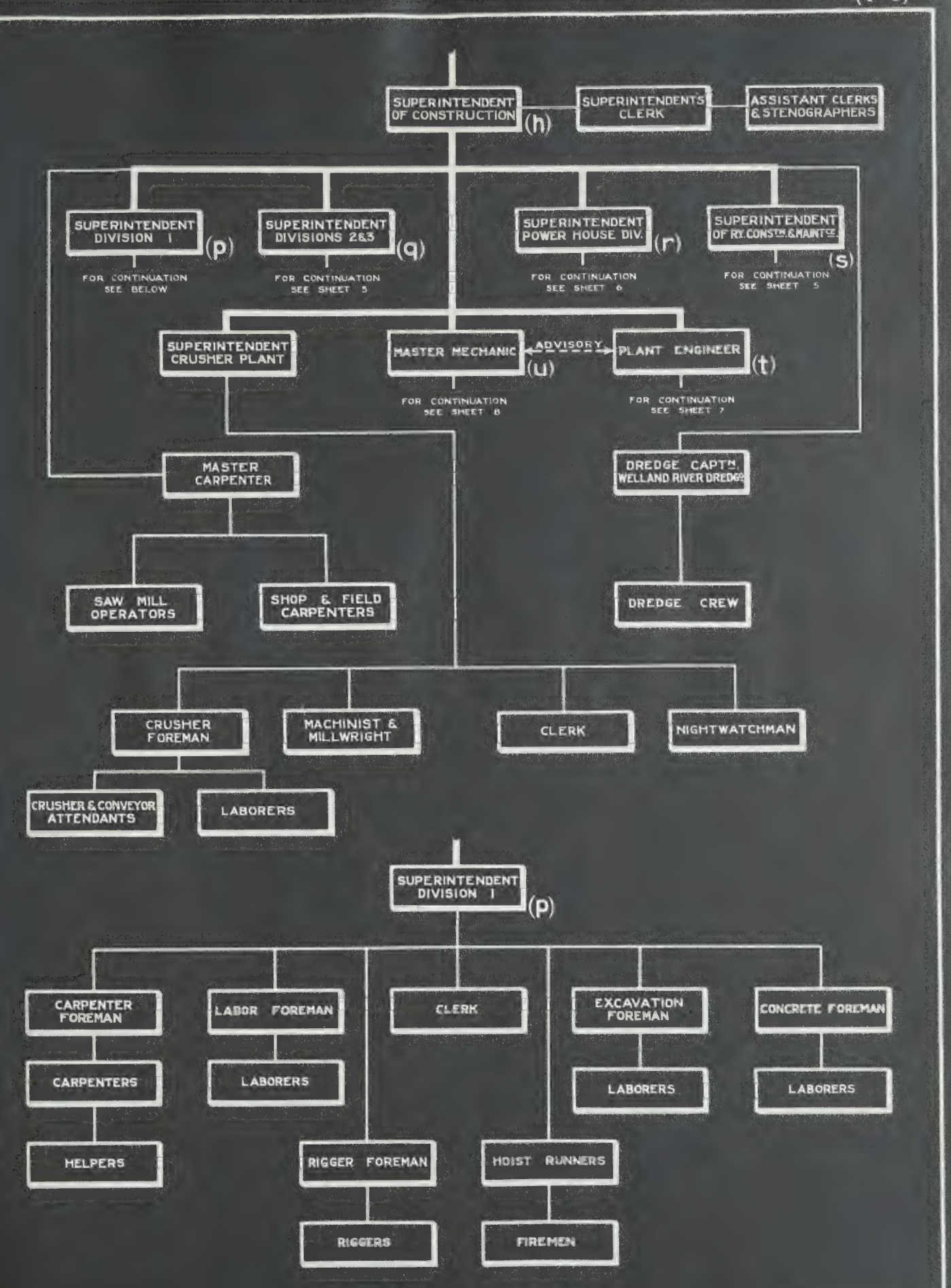
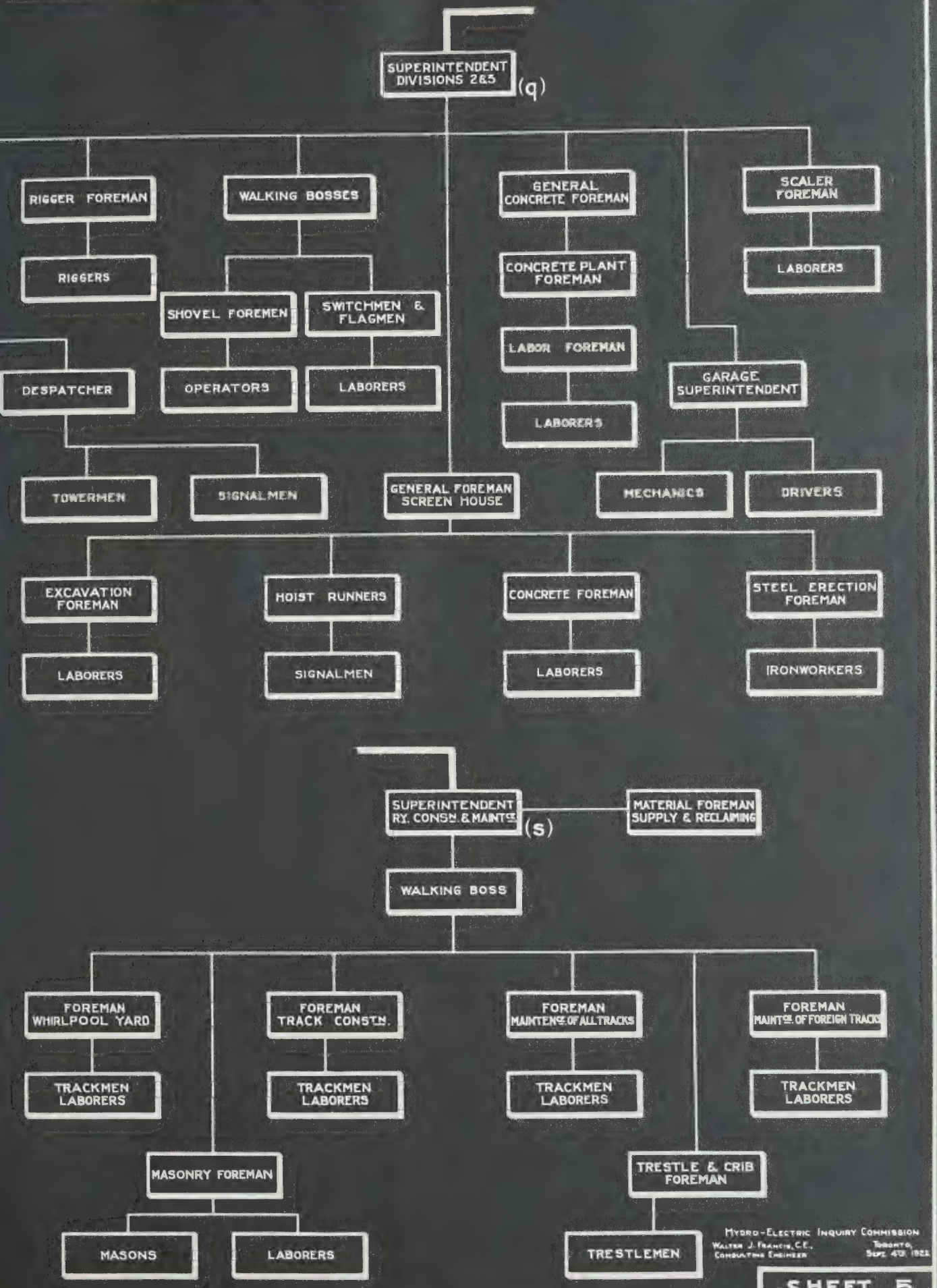
WALTER J. FRANCIS C.E.
CONSULTING ENGINEER
TORONTO
SEPT. 4TH 1922

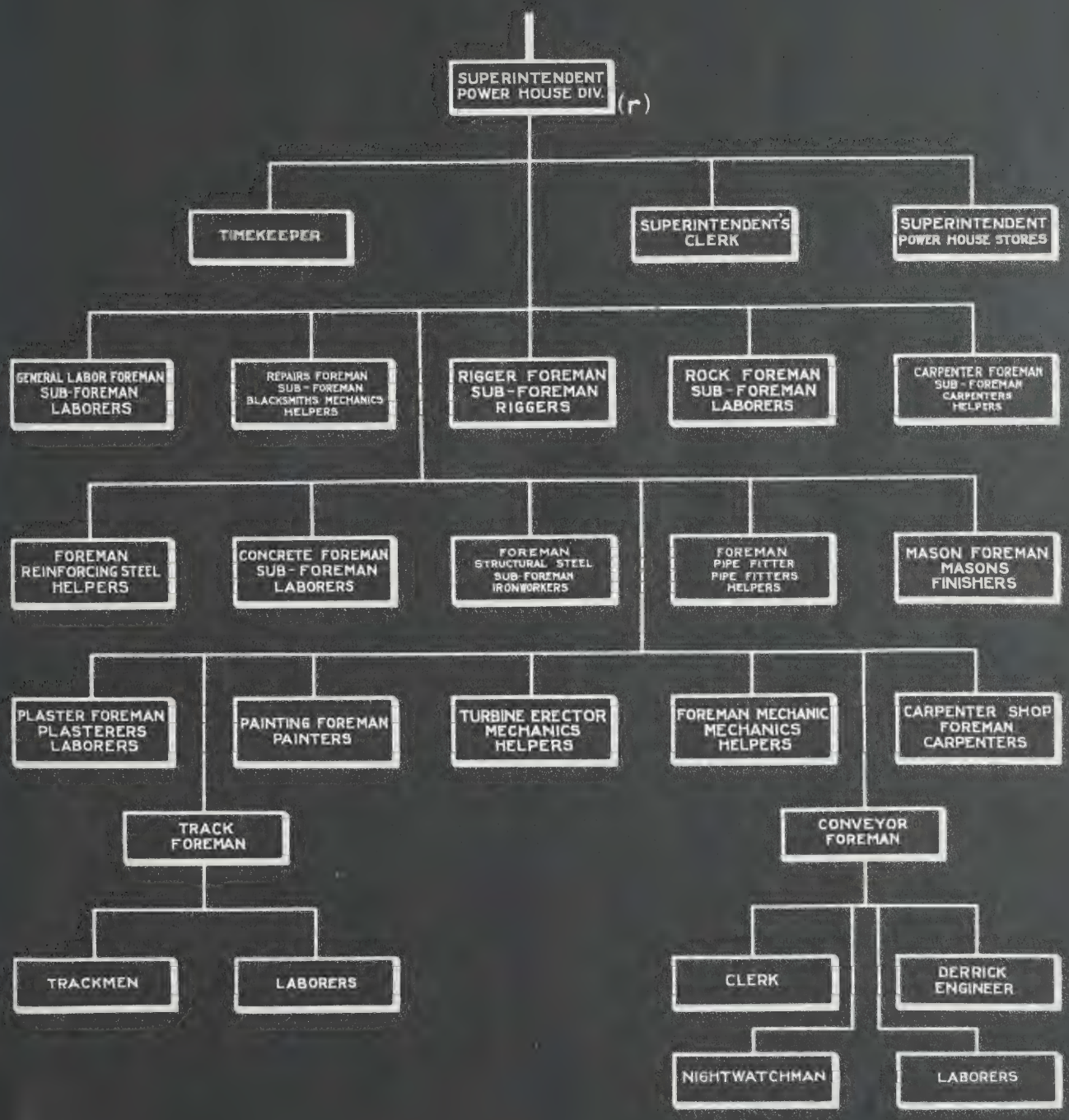
SHEET 3



HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS, C.E., CONSULTING ENGINEER
TORONTO, SEPT. 4TH 1922

SHEET 4


SUPERINTENDENT DIVISIONS 2&3
(q)
RIGGER FOREMAN
RIGGERS
WALKING BOSSES
SHOVEL FOREMEN
SWITCHMEN & FLAGMEN
OPERATORS
LABORERS
DESPATCHER
TOWERMEN
SIGNALMEN
GENERAL CONCRETE FOREMAN
CONCRETE PLANT FOREMAN
LABOR FOREMAN
LABORERS
SCALER FOREMAN
LABORERS
GARAGE SUPERINTENDENT
MECHANICS
DRIVERS
GENERAL FOREMAN SCREEN HOUSE
EXCAVATION FOREMAN
LABORERS
HOIST RUNNERS
SIGNALMEN
CONCRETE FOREMAN
LABORERS
STEEL ERECTION FOREMAN
IRONWORKERS
SUPERINTENDENT RY. CONSN. & MAINTCE.
(s)
MATERIAL FOREMAN SUPPLY & RECLAIMING
WALKING BOSS
FOREMAN WHIRLPOOL YARD
TRACKMEN LABORERS
FOREMAN TRACK CONSTN.
TRACKMEN LABORERS
FOREMAN MAINTENCE. OF ALL TRACKS
TRACKMEN LABORERS
FOREMAN MAINTCE. OF FOREIGN TRACKS
TRACKMEN LABORERS
MASONRY FOREMAN
MASONS
LABORERS
TRESTLE & CRIB FOREMAN
TRESTLEMEN
HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS, C.E.,
CONSULTING ENGINEER
TORONTO,
SEPT. 4TH, 1922
SHEET 5



HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS, C.E.
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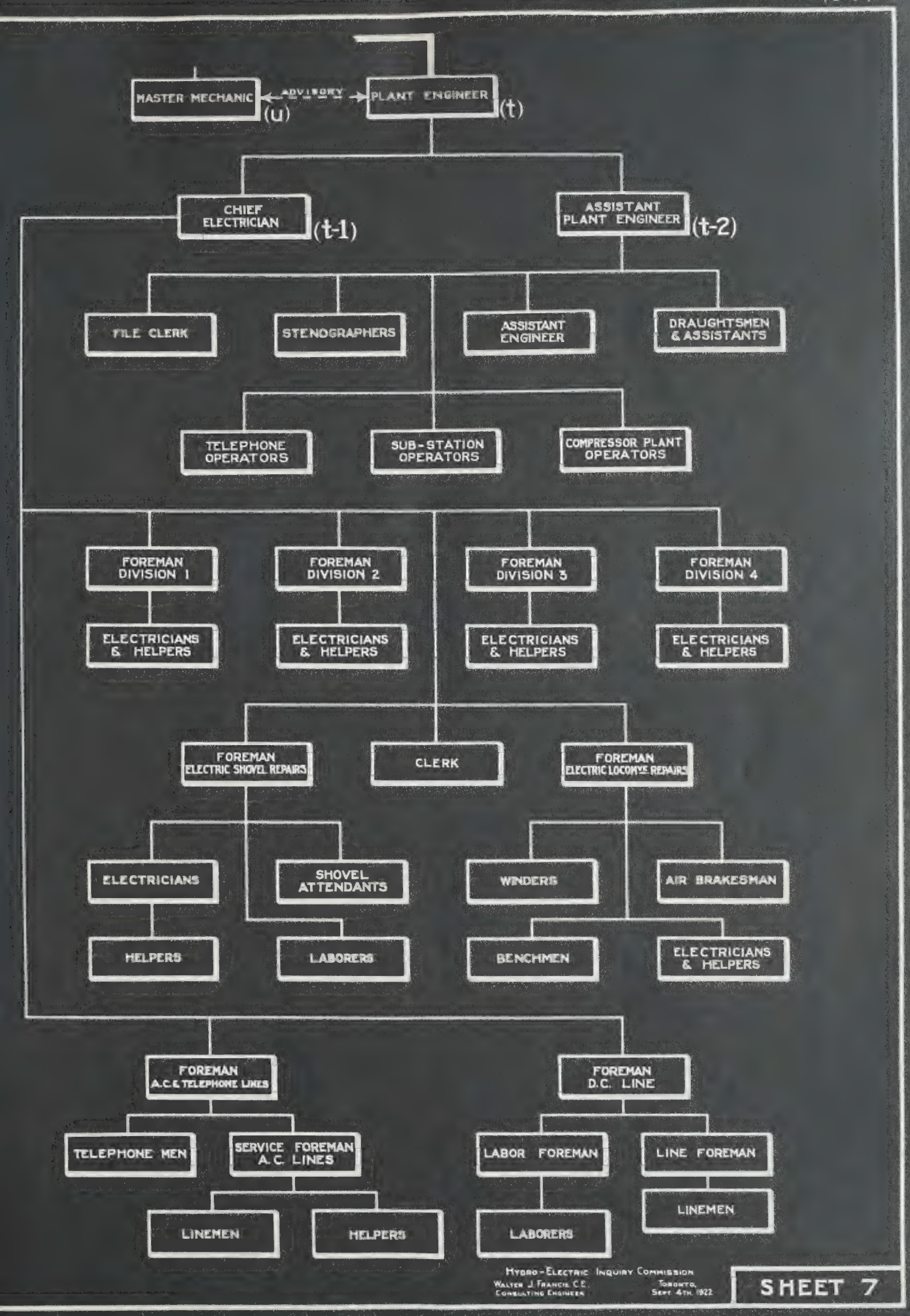
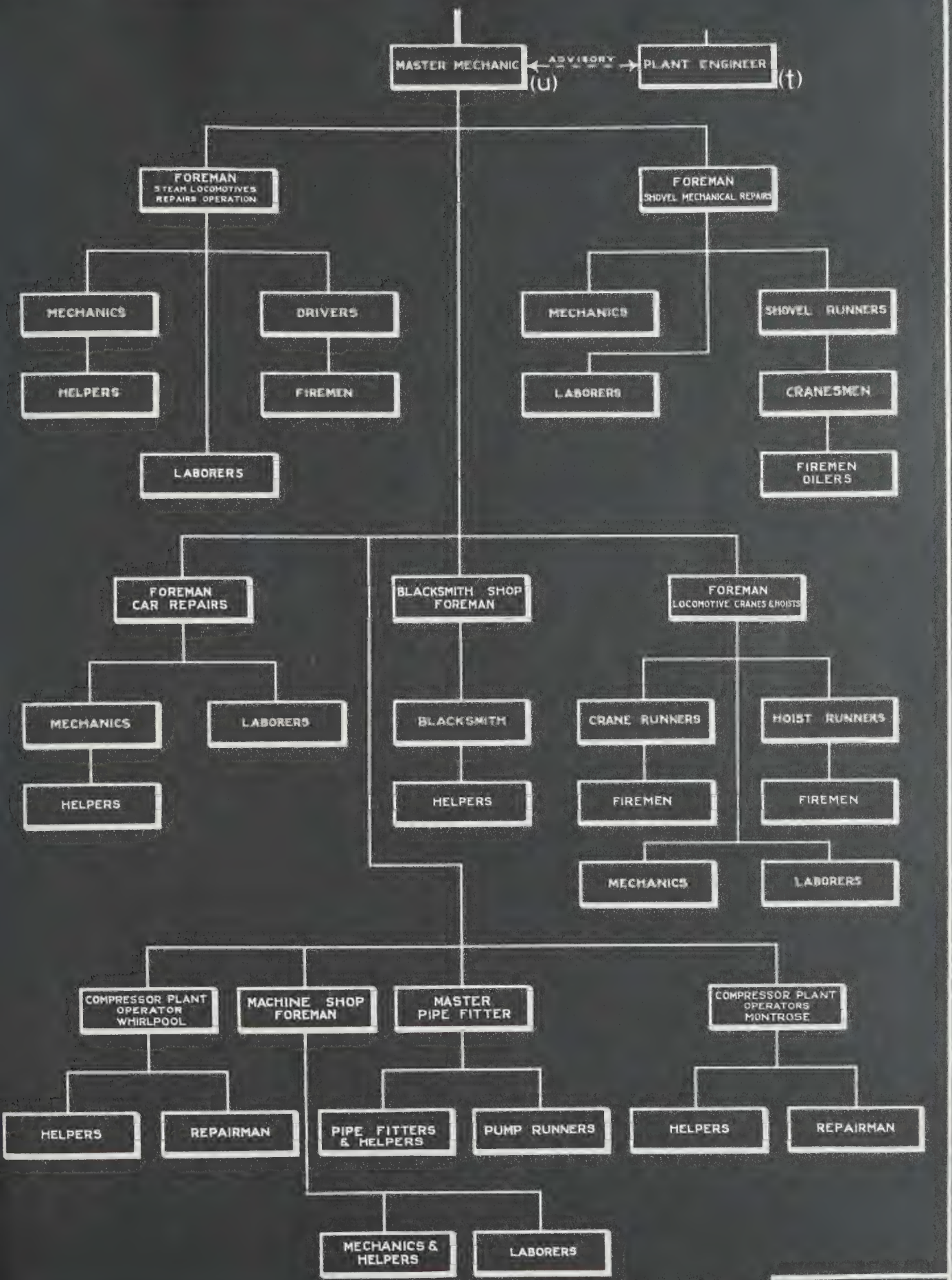
TORONTO, SEPT. 4TH 1922

SHEET 6


MASTER MECHANIC
(u)
ADVISORY
PLANT ENGINEER
(t)
CHIEF ELECTRICIAN
(t-1)
ASSISTANT PLANT ENGINEER
(t-2)
FILE CLERK
STENOGRAPHERS
ASSISTANT ENGINEER
DRAUGHTSMEN & ASSISTANTS
TELEPHONE OPERATORS
SUB-STATION OPERATORS
COMPRESSOR PLANT OPERATORS
FOREMAN DIVISION 1
FOREMAN DIVISION 2
FOREMAN DIVISION 3
FOREMAN DIVISION 4
ELECTRICIANS & HELPERS
ELECTRICIANS & HELPERS
ELECTRICIANS & HELPERS
ELECTRICIANS & HELPERS
FOREMAN ELECTRIC SHOVEL REPAIRS
CLERK
FOREMAN ELECTRIC LOCOMVE REPAIRS
ELECTRICIANS
SHOVEL ATTENDANTS
WINDERS
AIR BRAKESMAN
HELPERS
LABORERS
BENCHMEN
ELECTRICIANS & HELPERS
FOREMAN A.C. & TELEPHONE LINES
FOREMAN D.C. LINE
TELEPHONE MEN
SERVICE FOREMAN A.C. LINES
LABOR FOREMAN
LINE FOREMAN
LINEMEN
LINEMEN
HELPERS
LABORERS
HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS, C.E.
CONSULTING ENGINEER
TORONTO,
SEPT. 4TH. 1922
SHEET 7



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WALTER J. FRANCIS, C.E.,
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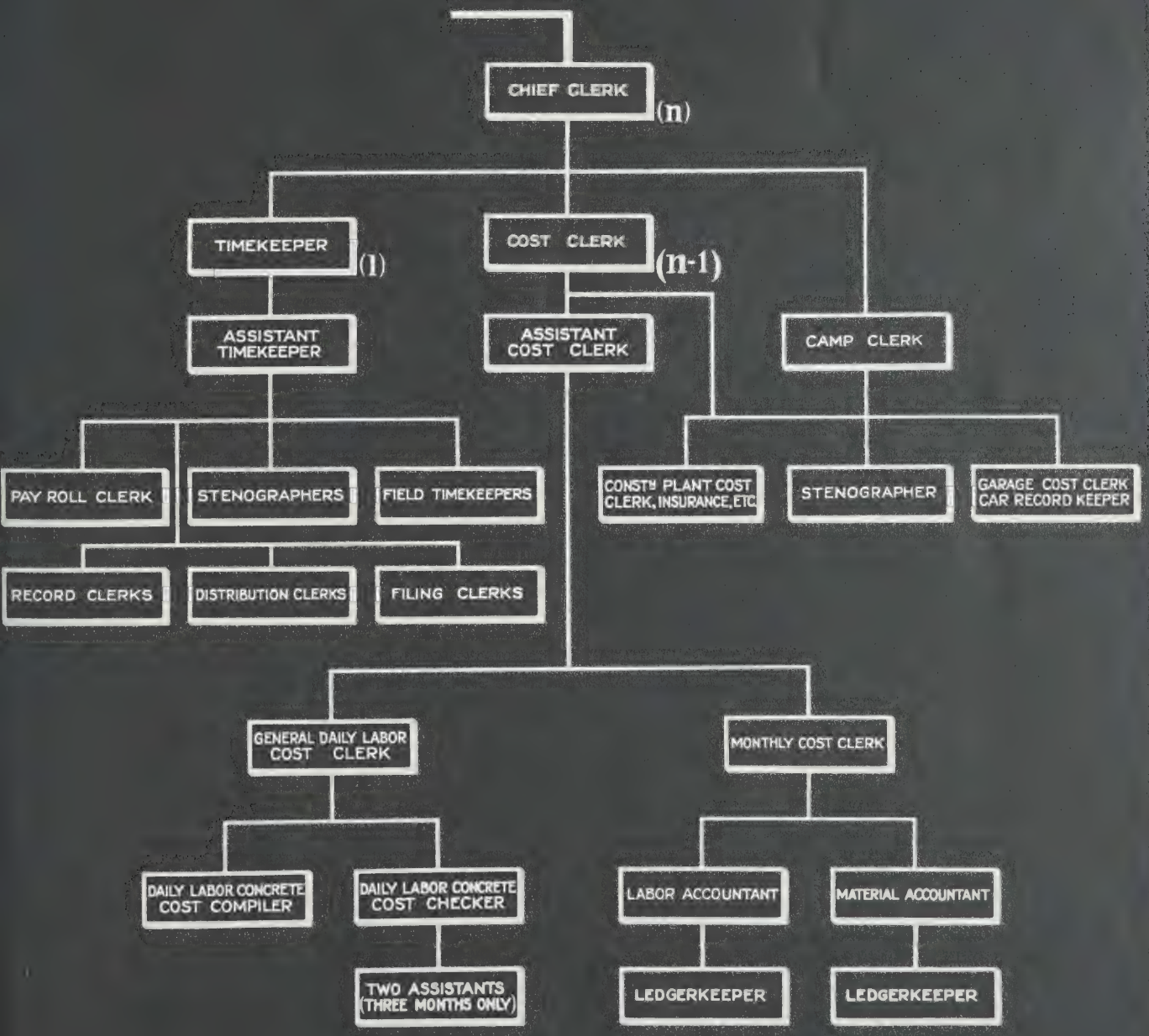
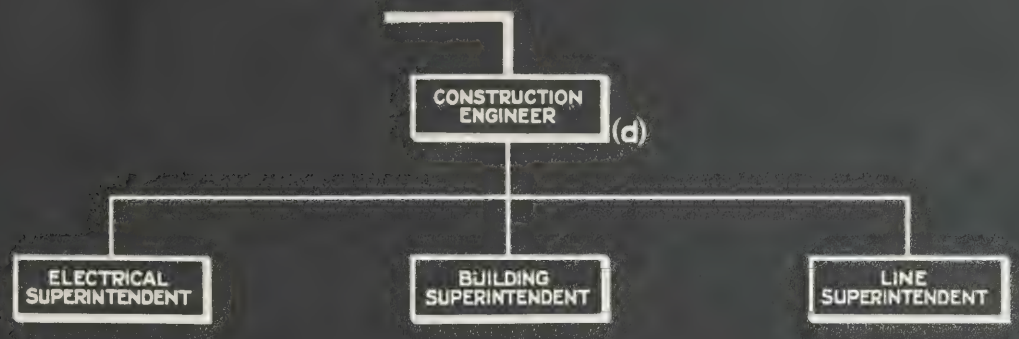
TORONTO,
SEPT. 4TH 1922

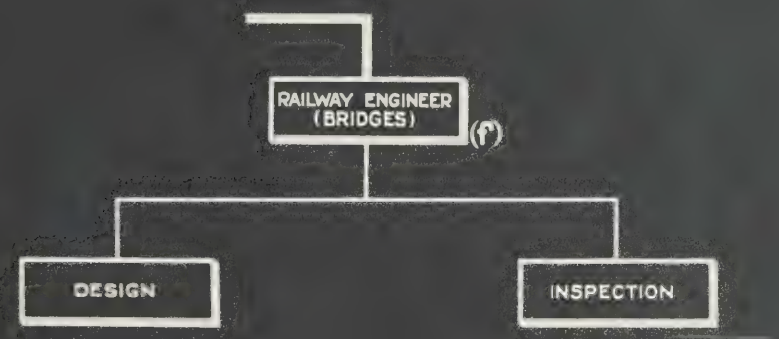
SHEET 8

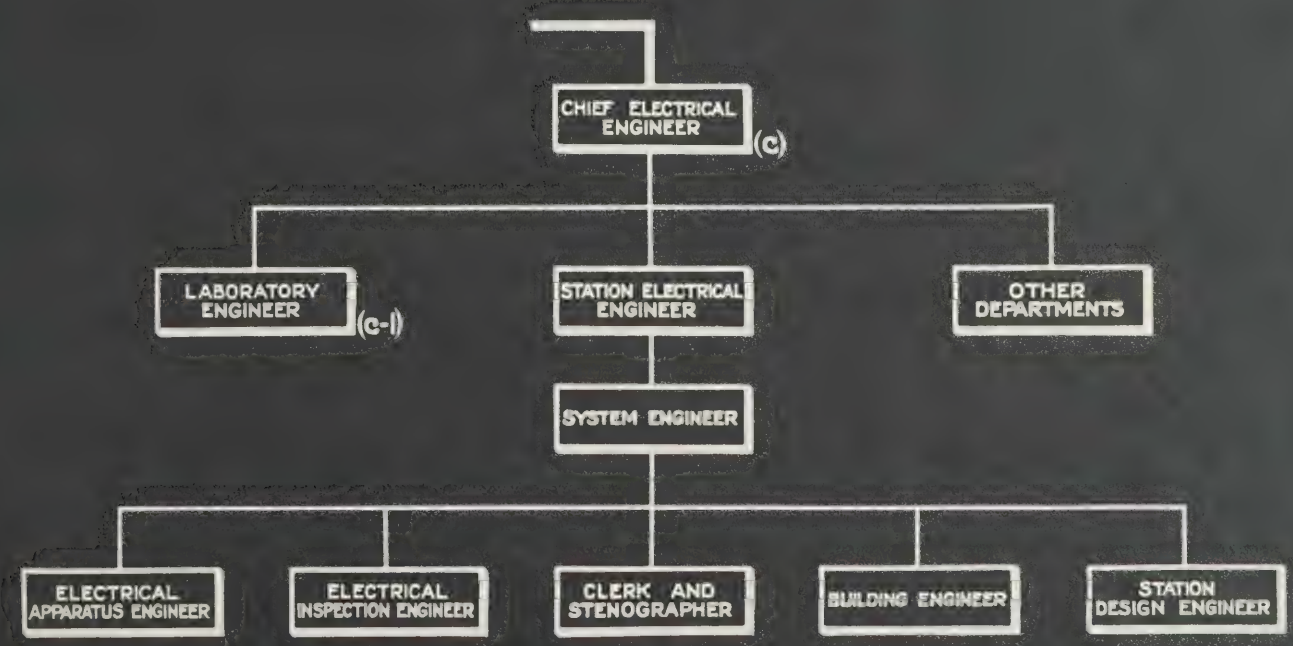


HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS C.E., CONSULTING ENGINEER
TORONTO, SEPT 4TH 1922

SHEET 9







HYDRO-ELECTRIC INQUIRY COMMISSION
WALTER J. FRANCIS, C.E.,
CONSULTING ENGINEER
TORONTO,
SEPT. 4TH, 1922

SHEET 10

The Commission.

The Hydro-Electric Power Commission of Ontario assumes the full responsibility for the work, and in doing so issued instructions to four principal officers, namely, the Secretary; the Treasurer; the Chief Engineer; and the Chief Accountant.

In view of the fact that this report is dealing primarily with Engineering Data in connection with the Queenston-Chippawa Power Development, I have not deemed it necessary to elaborate upon the functions of the Commission or upon its personnel.

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The Secretary.

The Secretary of the Hydro-Electric Power Commission has charge of the secretarial and law work, and the right-of-way and insurance business of the Commission, of which only the Right-of-Way Department was directly connected with the Queenston-Chippawa Power Development. The organization and personnel of the Right-of-Way Department is given in Chapter "J" of the Engineering Data of the Queenston-Chippawa Power Development.

The Treasurer.

The relationship of the Treasurer of the Hydro-Electric Power Commission to the Queenston-Chippawa Power Development will be dealt with by Messrs. Price, Waterhouse & Company, in co-operation with us in a subsequent document.

[illegible]

The Hydro-Electric Power Commission of Ontario assumes the full responsibility for the work, and is doing so through its Secretary to four principal officers, namely, the Secretary, the Treasurer, the Chief Engineer and the Chief Accountant.

In view of the fact that this report is dealing primarily with financial data in connection with the Queenston-Chippawa Power Development, I have not deemed it necessary to elaborate upon the functions of the Commission as upon the personnel.

[illegible]

The Secretary of the Hydro-Electric Power Commission has charge of the secretarial and law work, and the right-of-way and insurance business of the Commission of which only the Niagara-Chippawa Development was directly connected with the Queenston-Chippawa Power Development. The organization and personnel of the Right-of-Way Department is given in Chapter "C" of the Engineering Data of the Queenston-Chippawa Power Development.

[illegible]

The responsibility of the Treasurer of the Hydro-Electric Power Commission in the Queenston-Chippawa Power Development will be dealt with by Treasurer, Price, [illegible] Company, in co-operation with [illegible].

The Chief Accountant.

The relationship of the Chief Accountant of the Hydro-Electric Power Commission to the Queenston-Chippawa Power Development will be dealt with by Messrs. Price, Waterhouse & Co., in the document to which reference has already been made.

The Chief Engineer. Reference Letter on Chart...(a).

The position of Chief Engineer of the Hydro-Electric Power Commission has been occupied by Mr. F. A. Gaby since 1912. His engineering qualifications are given on page F-32 hereof.

The Chief Engineer has charge of all engineering matters for the Commission, to which body he reports. He has direct charge of a number of departments, the principal of which, for the Queenston-Chippawa Power Development, are under the following officers:- the Chief Hydraulic Engineer; the Chief Electrical Engineer; the Construction Engineer; the Railway Engineer; the Engineer in charge of Employees' Relations; and the Purchasing Agent, all of whom report directly to the Chief Engineer.

For the construction of the Queenston-Chippawa Power Development, the Chief Engineer's primary function was to receive instructions from the Commission and to issue corresponding orders to his various departmental heads. He obtained reports from his departmental heads, approved the plans developed by them, and generally directed policy and procedure.

The Chief Hydraulic Engineer. Reference Letter on Chart...(b).

The position of Chief Hydraulic Engineer has been held since its formation in

1909 by Mr. H. G. Acres, the engineering qualifications of whom are given on page F-33 hereof.

The Chief Hydraulic Engineer reports directly to the Chief Engineer, and has charge of the Hydraulic Department of the Hydro-Electric Power Commission at Toronto, as well as that of the Queenston-Chippawa Power Development with the exception of some specialized details.

The function of the Hydraulic Department of the Commission is to prepare all reconnaissance and other surveys, with corresponding estimates, (in accordance with standard practice) in connection with all power development projects under consideration by the Commission. It is also the function of this Department to prepare detailed plans, specifications and estimates for such projects, and to supervise construction. As engineers, the staff of the Hydraulic Department directs the actual construction operations of the Construction Department of the Commission. This function applies to all hydraulic works in connection with hydro-electric projects, including the sub-structures, the buildings, and the purchase and installation of hydraulic machinery and auxiliaries connected therewith.

In the case of the Queenston-Chippawa Power Development, this general method of procedure was varied on account of the magnitude of the work and the war conditions prevailing during the construction period. The Chief Hydraulic Engineer had complete charge of the general design and of the construction of the development, with the exception of the bridges which were designed by the Railway Department. A special construction force was organized under the immediate direction and control of the Chief Hydraulic Engineer, and with the exception of minor contracts, the whole of the permanent construction complete and ready for the permanent struc-

tures and machinery was done by it. The electrical equipment of the power house, not under contract, was erected by the Electrical Section of the Construction Department, the Chief Hydraulic Engineer being in immediate charge of the necessary co-ordination.

The invoices for all materials purchased were received and examined by the Chief Hydraulic Engineer. On being satisfied as to their correctness, he approved and passed the documents for payment in due course. He likewise issued all certificates in connection with contracts.

The Chief Hydraulic Engineer received his instructions from the Chief Engineer, and he directed the construction work through the Works Engineer whose whole time was devoted to the Queenston-Chippawa Power Development. For the greater part of the time the Chief Hydraulic Engineer was assisted directly by the Personal Assistant to the Chief Hydraulic Engineer.

<u>The Assistant Hydraulic Engineer.</u> <u>Reference Letter on Chart</u>...(b-2)

The position of Assistant Hydraulic Engineer is held by Mr. Thos. H. Hogg, the engineering qualifications of whom are given on page F-35 hereof. The immediate functions of his position are to give detail direction to the work of the various sub-divisions of the Hydraulic Department, including the work of the Hydraulic Engineer of Design, of the Mechanical Engineer and of the Secretary of the Department. The organization of the Hydraulic Department, Toronto, is shown on the chart included herewith as page F-5.

The Hydraulic Engineer of Design. Reference Letter on Chart...(b-3).

The position of Hydraulic Engineer of Design is held by Mr. M. V. Sauer, the engineering qualifications of whom are given on page F-36 hereof. The functions of his position are to give detail supervision to the original design of all hydraulic structures and to check, critically study and approve the designs of all hydraulic and other mechanical equipment being built for the Commission. In addition, he has a continuous relationship with the Chief Hydraulic Engineer and with the Assistant Hydraulic Engineer in an advisory professional capacity.

The Mechanical Engineer. Reference Letter on Chart...(b-4).

The position of Mechanical Engineer is held by Mr. Adolf Aeberli, the engineering qualifications of whom are given on page F-37 hereof. The functions of his position are to assist the Chief Hydraulic Engineer and the Assistant Hydraulic Engineer as a specialist in connection with the design, installation, operation and testing of turbine, pumping and other mechanical equipment. This function relates specifically to the installation of new plants. He is also required to periodically inspect the older plants of the Commission and to advise in the matter of replacement, improvements and re-design of mechanical equipment.

The Personal Assistant to Chief Hydraulic Engineer. Reference Letter on Chart...(b-1)

The Personal Assistant to the Chief Hydraulic Engineer during the construction of the Queenston-Chippawa Power Development was Mr. R. L. Hearn, the engineering

qualifications of whom are given on page F-34 hereof.

The primary function of his position was to act as the executive agent of the Chief Hydraulic Engineer, implementing instructions or decisions relating to the prosecution of the work in the field at Niagara. In view of Mr. Hearn's detail knowledge of all matters relating to the design of the Queenston-Chippawa Power Development, another of his important functions was to act as liaison officer between the Toronto Office and the Field Office at Niagara, a necessity owing to the fact that the construction force at Niagara was directly responsible for the construction of all building superstructures designed by the Electrical Engineering Department. Plans, specifications, instructions and so forth were all transmitted through the Chief Hydraulic Engineer, and, in detail, through the medium of his Personal Assistant.

Mr. Hearn resigned in the summer of 1922 to take a position in the United States.

The Works Engineer. Reference Letter on Chart...(i).

The Works Engineer was the principal official on the Queenston-Chippawa Power Development devoting his entire time thereto. The position was occupied by Mr. Jas. B. Goodwin, the engineering qualifications of whom are given on pages F-49 and F-50 hereof.

The Works Engineer was directly responsible to the Chief Hydraulic Engineer. He directed both the engineering and the construction forces. The principal members of his staff consisted of the Superintendent of Construction; the Chief Field

Engineer; the Office Engineer; the Right-of-Way Engineer; and the Chief Clerk; all of whom had their own properly organized staffs.

Mr. Goodwin relinquished active work in 1920, owing to ill health, and Mr. Acres took up residence in Niagara in order to be in closer touch with the work.

The Chief Field Engineer. Reference Letter on Chart...(k).

The position of Chief Field Engineer has been held by Mr. A. C. D. Blanchard, the engineering qualifications of whom are given on page F-51 hereof. He has direct charge of all the field engineering work, of all inspection work, and of the progress records, reporting directly to the Works Engineer. His principal assistants in carrying out the work were two Division Engineers; an Assistant Engineer; an Assistant Engineer in charge of the field laboratory; and, for a short period, a special assistant. In addition, the Chief Field Engineer gave instructions to the Photography Department regarding the making of photographic records of the work from time to time.

The Superintendent of Construction. Reference Letter on Chart...(h).

The position of Superintendent of Construction was held by Mr. George H. Angell the qualifications of whom are given on pages F-44 to F-48 hereof. He reported directly to the Works Engineer, and was immediately responsible for the carrying out of the whole of the construction work on the Queenston-Chippawa Power Development. He was assisted in his work by the following departmental heads:- the Superintendent, Division No. 1; the Superintendent, Divisions Nos. 2 and 3;

the Superintendent, Power House Division; the Superintendent for the construction and maintenance of the Construction Railways; the Plant Engineer; and the Master Mechanic.

Mr. Angell resigned in the spring of 1922 to take a position in the United States, and his place was taken by Mr. H. L. Bucke to discharge the lighter duties then remaining.

The Superintendent of Division No. 1. Reference Letter on Chart...(p).

The position of Superintendent of No. 1 Division was held by Mr. C. Anderson, the qualifications of whom are given on page F-60 hereof. He has immediate charge of the construction work in Division No. 1 of the Queenston-Chippawa Development, which consists of the work on the Intake, the widening of the Welland River and the bridge construction at Chippawa and Montrose.

As shown on the diagram included herewith as page F-6, he directed the work of the Carpenter Foreman, the Labour Foreman, the Rigger Foreman, the Excavation Foreman, the Concrete Foreman and the Hoist Runners. The foremen are in direct control of the various groups of workmen.

The Superintendent of Divisions Nos. 2 and 3. Reference Letter on Chart...(q).

The position of Superintendent for Divisions Nos. 2 and 3 was held by Mr. Fred. W. Scriven, the qualifications of whom are given on page F-61 hereof.

The Superintendent of Divisions Nos. 2 and 3 has immediate charge of the construction work in these Divisions which consist of the whole of the work upon the

Canal from Station 10+00, near Montrose, up to and including the Screen House.

The organization of his departments is shown on the chart included herewith as page F-7, and it will be noted that through the foremen of the various kinds of work he directs the workmen. It will be noted that he also directs the garage service through the Garage Superintendent.

The Superintendent of Power House Division. Reference Letter on Chart...(r).

The position of Superintendent of the Power House Division has been held by Mr. Wm. L. LeRoy, the engineering qualifications of whom are given on page F-62 hereof.

The organization of the Department of the Superintendent of the Power House Division is shown on the chart included herewith as page F-8.

In addition to functions similar to those exercised by other division superintendents, the Superintendent of the Power House Division has immediate supervision of the storage area adjacent to the Michigan Central Railroad station at Queenston. All machinery, equipment and materials required for the construction of the Power House and for the installation of the hydraulic and the electrical equipment, were delivered to this area.

The Superintendent of Railway Construction and Maintenance. Reference Letter on Chart(s)

The position of Superintendent of Railway Construction and Maintenance has been held by Mr. Harold L. Bucke, whose engineering qualifications are given on page F-63 hereof.

The organization of the Railway Superintendent's department is shown on the chart on page F-7 hereof. It will be noted that through the Walking Boss he directs the work of six foremen, each of whom in turn have their laborers. During the early part of the construction work his function was to build the Construction Railway. Later, his duties were directed more particularly to the operation of the Railway and to the carrying out of the various changes required in the track layout from time to time as the work progressed.

Since the resignation of Mr. Angell in the Spring of 1922, Mr. Bucke has been acting also as Superintendent of Construction.

The Office Engineer. Reference Letter on Chart...(m).

The position of Office Engineer was occupied previous to 1919 by Mr. W. Smaith. Subsequently the position was held by Mr. Rex F. Johnson, the engineering qualifications of whom are given on page F-56 hereof.

The Office Engineer had charge of the filing systems for construction plans and records, and had a staff under his supervision. This organization is shown on the chart included herewith as page F-5.

All plans amplifying the Head Office drawings, for the further enlightenment and instruction of the field staff, together with plans having to do with the building of new, or with the improving of old construction plant, were prepared by the Office Engineer. It was also his function to prepare in plan form all details necessary for the Toronto Office in connection with the negotiations concerning railway, highway, power, telegraph and telephone line crossings.

Mr. Johnson resigned in the Spring of 1922, and his place has not been filled.

The Right-of-Way Engineer. Reference Letter on Chart...(o).

The position of Right-of-Way Engineer has been held by Mr. S. W. Johnston, the engineering qualifications of whom are given on page F-59 hereof. As indicated on the chart on page F-3, the Right-of-Way Engineer had a staff of assistants. His duties consisted primarily of the surveys of the necessary lands for the Right-of-Way and construction purposes; the preparation of plans and descriptions thereof; and the laying out of the lands after purchase.

The Plant Engineer. Reference Letter on Chart...(t).

The position of Plant Engineer was held by Mr. Rufus T. Gent, the engineering qualifications of whom are given on page F-64 hereof.

The organization of the Plant Engineer's force is shown on page F-9 hereof, and it will be noted that provision was made for co-operation between his department and that of the Master Mechanic. The Plant Engineer's force was divided into two parts, one being under the direction of the Chief Electrician and the other under the Assistant Plant Engineer. His duties primarily were to keep the electrical part of the construction plant in a proper state of maintenance and repair, and to suggest improvements thereon for the consideration of his superiors.

Mr. Gent resigned in the fall of 1921 to take up a position in the United States.

The Chief Electrician. Reference Letter on Chart...(t-1).

The position of Chief Electrician has been held by Mr. John T. Nablo, the

qualifications of whom are given on page F-65 hereof.

The Chief Electrician came under the direct authority of the Plant Engineer, and he had a foreman for each of the various divisions on the work, a foreman for the repair of electric shovels, a foreman for the repair of electric locomotives, a foreman for the alternating current and telephone lines, and a foreman for the direct current line. All of the foremen referred to above had their staffs of electricians and helpers.

The Assistant Plant Engineer. Reference Letter on Chart...(t-2).

The position of Assistant Plant Engineer was held by Mr. S. W. Andrews, the engineering qualifications of whom are given on page F-66 hereof. He acted as Assistant to the Plant Engineer.

The Chief Clerk. Reference Letter on Chart...(n).

The position of Chief Clerk was held by Mr. F. F. Cooper, the qualifications of whom are given on page F-57 hereof.

The Chief Clerk had direction of the Timekeeping and Cost Departments, which were in charge of a Timekeeper and a Cost Clerk respectively. He also personally directed the management of the camps.

The organization of the Chief Clerk's department is shown on the chart included herewith as page F-11.

The Timekeeper. Reference Letter on Chart...(1).

The position of Timekeeper has been held by Mr. W. J. Archer, the qualifications

of whom are given on page F-55 hereof.

As indicated on the chart included herewith as page F-11, he was assisted in the timekeeping work by a staff, including an Assistant Timekeeper, a pay-roll record clerk, filing and distribution clerks, a field timekeeper and others. The Timekeeper was responsible for the record of time worked by every employee.

The Cost Clerk. Reference Letter on Chart...(n-1).

The position of Cost Clerk was held by Mr. Arthur G. Bradley, the qualifications of whom are given on page F-58 hereof.

As indicated on the Chart on page F-11, the Cost Clerk had charge of the staff for keeping the cost records. In addition, cost records were reported to him direct by the clerks in charge of the Construction Plant and of the Garage.

The Master Mechanic. Reference Letter on Chart...(u).

The position of Master Mechanic has been held by Mr. Peter R. Reid, the qualifications of whom are given on page F-67 hereof.

The organization of the Master Mechanic's Department is shown on the Chart included herewith as page F-10. It will be noted that in addition to co-operating with the Plant Engineer, the Master Mechanic had direct control of the repairs to steam locomotives, steam shovels, cranes and cars, and of the operation of the compressor plant at Montrose and at the Whirlpool. It was also his duty to study the construction plant and to suggest improvements for the consideration of his superiors.

The Division Engineer. (Canal). Reference Letter on Chart...(k-1).

The position of Division Engineer for the Canal was held by Mr. Frank W. Clark, the engineering qualifications of whom are given on page F-52 hereof.

The Division Engineer for the Canal had direct charge of three Resident Engineers, and of an Office Assistant Engineer. Each of the Resident Engineers had his staff of field parties, inspectors and draftsmen. It was the duty of the Division Engineer for the Canal to keep the Chief Field Engineer fully advised as to the progress of the work in all its details, including the rate of progress of the shovels and of the concrete lining plants, and of any conditions arising from day to day affecting the progress, quality and adequacy of the finished work. It was also his function, through the Chief Field Engineer, to direct and instruct the construction organization, either personally or through his Resident Engineers, on all occasions where progress, quality and adequacy of work were in question or in danger by reason of the methods of procedure of the construction force.

The general organization of the staff of the Division Engineer of the Canal is shown on the chart included herewith as page F-4.

Mr. Clark's duties have now been extended to include the construction work at the Intake.

Division Engineer. (Power House). Reference Letter on Chart...(k-2).

The position of Division Engineer for the Power House has been held by Mr. Walter Jackson, the engineering qualifications of whom are given on page F-53 hereof.

The duties of the Division Engineer for the Power House were substantially similar to those above elaborated in the case of the Division Engineer of the Canal. He, also, had his staff of instrumentmen, inspectors and draftsmen, as indicated on the chart included herewith as page F-4.

Assistant Engineer in Charge of Field Laboratories. Reference Letter on Chart (k-3).

The position of Assistant Engineer in charge of the Field Laboratories was held by Mr. T. V. McCarthy, the engineering qualifications of whom are given on page F-54 hereof.

The duties of the Assistant Engineer in charge of Field Laboratories were to co-operate with the department of the Laboratory Engineer, Toronto, in the inspection of sand, concrete, stone and other materials.

The Chief Electrical Engineer. Reference Letter on Chart...(c).

The position of Chief Electrical Engineer of the Hydro-Electric Power Commission is held by Mr. E. T. J. Brandon, the engineering qualifications of whom are given on page F-58 hereof.

The Chief Electrical Engineer has direct charge of the Electrical Engineering department of the Hydro-Electric Power Commission and reports directly to the Chief Engineer. In regard to the Queenston-Chippawa Power Development, he had charge, as Engineer, of the design, purchase and installation of all of the electrical equipment. He also had charge of the design of the Whirlpool and Montrose sub-stations, from which the construction plant was operated. In addition, he had

charge of the specifications and design of the Power House superstructure, together with the purchase of special materials such as steel, sash and tiles. His functions embraced the Screen House superstructure in a similar way, with the exception that the structural steel framework was designed and purchased by the Hydraulic Department.

The organization of the department of the Chief Electrical Engineer is shown on the chart included herewith as page F-12.

The Laboratory Engineer. Reference Letter on Chart...(c-1).

The position of Laboratory Engineer has been held by Mr. W. P. Dobson, the engineering qualifications of whom are given on page F-39 hereof.

The Laboratory Engineer reports directly to the Chief Electrical Engineer, and has charge of the Testing Laboratories of the Hydro-Electric Power Commission.

The laboratories are fully equipped for the scientific testing of all construction material, especially sand, cement, stone and concrete. Electrical tests of all kinds can also be readily performed within the range of the materials and devices used by the Hydro-Electric Power Commission. The laboratories also include a well equipped chemistry department, as well as a photography and blue-print department.

The Construction Engineer. Reference Letter on Chart...(d).

The position of Construction Engineer has been held by Mr. A. V. Trimble, the qualifications of whom are given on page F-40 hereof.

The Construction Engineer has charge of all construction work for the Hydro-Electric Power Commission, with the exception of the Queenston-Chippawa Power Development, in which case he had charge of the installation of all electrical equipment in the Power House and the Screen House. His organization for carrying out this work is indicated on the Chart included herewith as page F-12.

The Railway Engineer. Reference Letter on Chart...(f).

The position of Railway Engineer has been occupied by Mr. T. U. Fairlie, the engineering qualifications of whom are given on page F-42 hereof.

The relationship of the Railway Engineering Department to the Queenston-Chippawa Power Development consisted of the design and engineering of the various bridges across the Canal and of the negotiation of crossing agreements with the various corporations involved. The Railway Engineer supplied the detail plans of bridge structures, which were checked by the Chief Hydraulic Engineer. The bridges were subsequently constructed by the Hydraulic Department. All of the railway bridges were built under the inspection of a representative appointed by the railway interested therein. The Railway Engineer was represented on the work by an inspector during the construction of the bridges.

The permanent highway bridges are being constructed by contract work under the direct supervision of the Railway Engineer.

The Purchasing Agent. Reference Letter on Chart...(e).

The position of Purchasing Agent has been held by Mr. B. O. Salter, the qualifications of whom are given on page F-41 hereof.

The Purchasing Agent receives instructions directly from the Chief Engineer, and arranges for the purchase of all equipment and material requisitioned by the various branches of the engineering departments through the Chief Engineer.

This function of the Purchasing Agent is limited to acting upon requisitions referred to him by the various departments and does not apply to all purchases made by the Commission. In the case of the purchase of equipment involving engineering design and study, such as turbines and generators, purchase is made on the basis of recommendations submitted direct to the Chief Engineer by the department primarily interested.

The Engineer in Charge of Employees' Relations. Reference Letter on Chart...(g).

The position of Engineer in Charge of Employees' Relations has been held by Mr. Wills Maclachlan, the engineering qualifications of whom are given on page F-43 hereof. Mr. Maclachlan is a Consulting Engineer in Toronto, and devoted only part of his time to the needs of the Hydro-Electric Power Commission. He has two officers reporting directly to him, namely, the Medical Officer of the Niagara Division, and the Employees' Relations Assistant, who are in turn over the Field Physician with his First Aid Assistants; the House Physician with his office assistants, nurses, orderlies and housekeepers; and the Sanitary Inspector.

Personnel.

In the text explaining the charts, the names of the occupants of the principal offices have been given in turn.

I have examined into the qualifications of the personnel of the principal departments of the Hydro-Electric Power Commission connected with the Queenston-Chippawa Power Development. The data has been obtained from the records of the Engineering Department of the Hydro-Electric Power Commission, verified in many cases by my own personal knowledge, and also by published records of many of the engineers concerned. Academical standing has been confirmed by reference to the records of the universities, and professional affiliations have been confirmed by reference to the records of the several recognized engineering organizations. In the following pages, F-32 to F-67 inclusive, I have included a biography of those already referred to by name, giving the full name, the corresponding reference letter on the charts, the position held, the date of birth, the birthplace, the academical training, the professional affiliations, and the qualifications, in summary form, taking each person in turn systematically but not necessarily in order of seniority. New positions are noted in the case of those who have left the service.

Frederick Arthur Gaby, B.A.Sc.

Reference Letter on Chart...(a)

Position.....Chief Engineer.

Date of Birth.....March 26th, 1878.

Birthplace.....Richmond Hill, Ontario.

Education.....Graduate of the University of Toronto, Mechanical and Electrical Engineering course, with honours, 1903; degree of B.A.Sc. with honours, 1904.

Professional Affiliations...Member, The Engineering Institute of Canada, February 25th, 1919.
Member, The American Society of Mechanical Engineers, 1916.
Member, American Society of Civil Engineers, 1916.
Fellow, American Institute of Electrical Engineers, 1918.

Experience:

1904 - 1906 Erecting Engineer, Canadian General Electric Company.

1906 - 1907 Electrical Engineer, Power Construction Department, City of Winnipeg.

1907 - 1911 Assistant Chief Engineer, Hydro-Electric Power Commission, Toronto, Ontario.

1911 - 1912 Acting Chief Engineer, Hydro-Electric Power Commission, Toronto, Ontario.

1912 to Date Chief Engineer, Hydro-Electric Power Commission, Toronto, Ontario.

Henry Girdlestone Acres, M.E.

Reference Letter on Chart...(b)

Position.....Chief Hydraulic Engineer.

Date of Birth.....May 1st, 1880.

Birthplace.....Paris, Ontario.

Education.....Graduate of the University of Toronto, Mechanical and Electrical Engineering course 1903; degree of M.E., 1916.

Professional Affiliations...Member, The Engineering Institute of Canada, November 16th, 1915. (Vice-President, 1921-1922).
Member, American Society of Civil Engineers, 1916.
Member, American Institute of Electrical Engineers, 1913.

Experience:

1903 - 1905 Assistant Mechanical Engineer, Canadian Niagara Power Company,

1905 - Assistant Engineer, Arizona Copper Company, Morenci, Arizona.

1905 - 1909 Assistant Engineer, Hydro-Electric Power Commission.

1909 to Date Chief Hydraulic Engineer, Hydro-Electric Power Commission.

Richard Lankaster Hearn, B.A.Sc.

Reference Letter on Chart...(b-1)

Position.....Personal Assistant to Chief Hydraulic Engineer.

Date of Birth.....May 18th, 1890.

Birthplace.....Toronto, Ontario.

Education.....Graduate of the University of Toronto, Civil Engineering course, degree of B.A.Sc., with honours, 1913.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, April 27th, 1920.

COPY

Experience:

1911 - 1913 Rodman and Instrumentman with Department of Works, Toronto, and with Dominion Bridge Company, Lachine, Quebec, (Summers only).

1913 - 1922 With the Hydraulic Department of the Hydro-Electric Power Commission in the following capacities:-

1913 - 1914 Designer on Wasdells Falls Power Development.

1914 - 1915 Shop Inspector for steel penstock and surge tank, Eugenia Falls Development.

1915 - 1918 Assistant Engineer on design of various power developments.

1918 - 1920 Chief Assistant to Hydraulic Engineer in charge of designing and drafting staff, Queenston-Chippawa Power Development, Niagara Falls, Ontarid.

1920 - 1922 Personal Assistant to Chief Hydraulic Engineer, Queenston-Chippawa Power Development, Niagara Falls, Ontario.

At present Chief Hydraulic Engineer, Washington Power Co., Spokane, Washington.

Thomas Henry Hogg, C.E.

Reference Letter on Chart...(b-2)

Position.....Assistant Hydraulic Engineer.

Date of Birth.....April 20th, 1884.

Birthplace.....Chippawa, Ontario.

Education.....Graduate of the University of Toronto, Civil Engineering course, degree of B.A.Sc., with honours, 1907; degree of C.E., 1914.

Professional Affiliations...Member, The Engineering Institute of Canada, 1922. (Associate Member, October 12th, 1912).
Member, American Society of Civil Engineers, November 2[illegible]th, 1919.

Experience:

1908 - In general practice and municipal work for the City of Niagara Falls, Ontario.

1908 - 1909 Demonstrator in Applied Mechanics at University of Toronto.

1909 - 1910 Draftsman and hydraulic computor, Ontario Power Company, installation of concrete conduit and extension of Power House at Niagara Falls, Ontario.

1910 - 1911 Assistant to Designing Engineer, Ontario Power Company, on design of surge tank for hydraulic regulation.

1911 - 1912 In charge of preliminary survey and design of Salmon River Hydro-Electric Power Development for the Ontario Power Company.

1912 to Date Assistant Hydraulic Engineer, Hydro-Electric Power Commission, Toronto, Ontario.

Max Veith Sauer, B.A.Sc.

Reference Letter on Chart...(b-3)

Position.....Hydraulic Engineer of Design.

Date of Birth.....June 7th, 1880.

Birthplace.....Plattsville, Ontario.

Education.....Graduate of the University of Toronto, Mechanical and Electrical Engineering course, degree of B.A.Sc., 1901.

Professional Affiliations...Member, The Engineering Institute of Canada, March 11th, 1913.

Experience:

1903 - 1904 Draftsman, Ontario Power Company.

1904 - 1905 Assistant to Mechanical Engineer, Ontario Power Company.

1905 - 1906 Chief Designer, Niagara Falls Power Company, Niagara Falls, New York.

1906 - 1907 Construction Engineer, Iroquois Construction Company, Buffalo, New York.

1907 - 1908 Chief Designer, Ontario Power Company, Niagara Falls, Ontario.

1908 - 1912 Mechanical Assistant to Engineer in charge, Ontario Power Company, Niagara Falls, Ontario.

1912 - 1918 Designing Engineer, Greater Winnipeg Water District, Winnipeg, Manitoba.

1918 to Date Hydraulic Engineer of Design, Hydro-Electric Power Commission, Toronto, Ontario.

Adolf Aeberli, M.E.

Reference Letter on Chart...(e-4)

Position.....Mechanical Engineer.

Date of Birth.....July 25th, 1877.

Birthplace.....Zurich, Switzerland.

Education.....Graduate of Winterthur Technical College, Zurich. Mechanical Engineering Course; degree of M.E., 1900.

Professional Affiliations...Member, The Engineering Institute of Canada, March 22nd, 1921.
Member, The American Society of Mechanical Engineers, 1916.

Experience:

1895 - 1906 On design of hydraulic turbines with various manufacturers in Europe.

1906 - 1919 Chief Draftsman and Chief Hydraulic Engineer, Allis Chalmers Company, Milwaukee, Montreal and Toronto.

1919 to Date Mechanical Engineer, Hydraulic Department, Hydro-Electric Power Commission, Toronto, Ontario.

Edgar Thomas John Brandon, B.A.Sc.

Reference Letter on Chart...(c)

Position.....Chief Electrical Engineer.

Date of Birth.....December 20th, 1880.

Birthplace.....Toronto, Ontario.

Education.....Graduate of the University of Toronto in Mechanical and Electrical Engineering course, degree of B.A.Sc. in 1901.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, June 10th, 1911.
Fellow, American Institute of Electrical Engineers, 1920. (Associate, 1908).

Experience:

1905 - 1906 In charge of design of hydraulic development for the Milford Construction Company, at Milford, Maine.

1906 - 1907 Chief draughtsman, Hugh L. Cooper & Company, New York City, McCall Ferry Power Plant, and Great Western Power Plant.

1907 - 1908 Assistant Engineer, in charge of design, Hudson River Terminals, New York City.

1908 to Date In charge of the design and construction of Transformer Stations for the Hydro-Electric Power Commission.

William Percy Dobson, M.A.Sc.

Reference Letter on Chart...(c-1)

Position.....Laboratory Engineer.

Date of Birth.....August 28th, 1885.

Birthplace.....Ballinafad, Ontario.

Education.....Graduate of the University of Toronto, Mechanical and Electrical Engineering course, degree of B.A.Sc., with honours, 1910; degree of M.A.Sc., 1916.

Professional Affiliations...Member, The Engineering Institute of Canada, April 27th, 1920.
Member, American Institute of Electrical Engineers, 1919.
Member, Illuminating Engineering Society, 1915.
Member, Mathematical Association of America, 1918.

Experience:

1909 - Draftsman, Buick Motor Company, Flint, Michigan, (five months).

1910 - Transformer and high tension tests, General Electrical Company, Pittsfield, Massachusetts, (six months).

1911 - 1912 Investigation and overhead construction, and testing of electrical equipment for the Engineering Department, Toronto Hydro-Electric System, Toronto, Ontario.

1912 - 1914 Engineering Alumni Research Fellow of the University of Toronto, engaged in investigation of transient phenomena and high tension transmission lines. This work was carried out at the University and on the systems of the Toronto Hydro-Electric Commission and the Hydro-Electric Power Commission and of the Toronto Power Company.

1914 to Date Laboratory Engineer in charge of testing and research, Hydro-Electric Power Commission, Toronto, Ontario.

Arthur Vincent Trimble, B.A.Sc.

Reference Letter on Chart...(d)

Position ..... Construction Engineer.

Date of Birth ..... September 12th, 1878.

Birthplace ..... Trafalgar, Ontario.

Education.....Graduate of the University of Toronto, Civil Engineering course, degree of B.A.Sc., 1905.

Professional Affiliations...Member, The Engineering Institute of Canada, 1921.
Associate Member, American Institute of Electrical Engineers, 1913.

Experience:

1905 - 1907 On general railway construction for Mackenzie, Mann and Company.

1908 to Date With Hydro-Electric Power Commission in the following capacities:-

1908 - 1910 Resident Engineer on construction and high tension transmission lines and telephone lines, Niagara Falls to St. Thomas, Ontario

1910 - 1911 Engineer in charge of maintenance of all high tension transmission lines.

1911 - 1912 Assistant Engineer on Hydraulic Investigation.

1913 - 1917 Engineer in charge of construction of high tension transmission lines and all the overhead construction for the London, Port Stanley Railway.

1918 to Date Construction Engineer, in charge of all construction for the Hydro-Electric Power Commission with the exception of the Queenston-Chippawa Power Development on which work the electrical installation in the power house and screen house only was included.

Bancroft Olden Salter

Reference Letter on Chart...(c).

Position..... Purchasing Agent.

Date of Birth..... March 18th, 1876.

Birthplace..... Washington, District of Columbia, (Canadian by Naturalization).

Education..... High School and College.

Experience:

1895 - 1906 In charge of Foreign Sales Branch, Engineering Department, General Electric Company, Schenectady, New York.

1906 - 1910 In charge of foreign department, handling contracts and sales, British Thompson Houston at Rugby, England.

1910 - 1911 In Engineering Department, Canadian General Electric Company, Peterborough, Ontario.

1911 - 1922 Purchasing Agent, Hydro-Electric Power Commission of Ontario, in charge of Purchasing, Production and Service, Garage and Printing Departments.

Thomas Urquhart Fairlie, B.Sc.

Reference Letter on Chart...(f)

Position.....Railway Engineer.

Date of Birth.....September 19th, 1884.

Birthplace.....L'Orignal, Ontario.

Education.....Graduate of Queen's University, Mining and Civil Engineering courses, degree of B.Sc. in 1904.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, August 12th, 1921.

Experience:

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1904	Assistant City Engineer, Kingston, Ontario.
1904 - 1905	Engineer in charge of location, Bay of Quinte Railway.
1905 - 1906	Location Engineer, Transcontinental Railway.
1906 - 1909	Resident Engineer on Construction, Toronto-Sudbury Line, Canadian Pacific Railway.
1909 - 1912	Assistant Engineer on construction of High Tension Transmission Lines for the Hydro-Electric Power Commission.
1912 - 1915	Manager, Building and Construction Co., Limited.
1915 - 1916	Assistant Engineer, joint location, High Tension Transmission Line and Radial Railway, Dundas-Hamilton-Toronto, for the Hydro-Electric Power Commission.
1916 - 1922	Railway Engineer, Hydro-Electric Power Commission, Toronto, Ontario.

Hills Maclachlan, B.A.Sc.

Reference Letter on Chart...(g).

Position .....Engineer in charge of Employees' Relations.

Date of Birth .....August 3rd, 1885.

Birthplace.....Toronto, Ontario.

Education.....Graduate of the University of Toronto, Mechanical and Electrical Engineering course, degree of B.A.Sc., with honours, 1906.

Professional Affiliations...Member, The Engineering Institute of Canada, April 27th, 1920.
Fellow, American Institute of Electrical Engineers, 1921, (Associated 1908). (Vice-President, 1919-1920).

Experience:

1909 -	Electrical Superintendent, Port Colborne Elevator, Department of Railways and Canals.
1910 - 1911	Inspector on Sub-station construction, Hydro-Electric Power Commission.
1911 - 1913	Local Manager, Trenton Electric and Water Company, Belleville, Ontario.
1913 - 1915	Engineer-in-charge, Electric Power Company, Toronto, Ontario.
1915 - 1917	Inspector, Electrical Employers' Association of Ontario.
1917 to Date	In charge of Employees' Relations Department of the Hydro-Electric Power Commission, and of the Accident Prevention Department of the Toronto Hydro-Electric System, Toronto, Ontario.

George H. Angell

Reference Letter on Chart...(h).

Position .....Superintendent of Construction.

Date of Birth.....About 1866.

Birthplace.....Grenville, Quebec.

Education .....Public School.

Experience:

The experience of Mr. Angell is not available in the same form as that of the other members of the organization. I have followed the subject by correspondence and am attaching hereto the copies of the correspondence in that connection, as follows:-

(a) A letter from Mr. Angell to Mr. Acres dated August 9, 1922, together with copy of a letter from Mr. Hugh Nawn to Mr. Angell, dated August 6, 1922.

(b) An extract from a letter written by Mr. Jas. B. Goodwin to myself, under date of August 24, 1922.

WALTER J. FRANCIS & COMPANY.

COPY FOR ENCLOSURE TO

(P-45)

COPY

"No. 357 Ave. "J", Bethlehem, Pa.,
August 9th, 1922.

Mr. H. G. Acres,
Chief Engineer of H.E.P.C.,
NIAGARA FALLS, Ontario.

Dear Sir:-

"Receiving a letter from you requesting my past experience on construction work and not deeming it necessary to begin at my very earliest work I will commence with my work on the Soulanges Canal.

"I had charge of Division 5 for the late Geo. Goodwin of Ottawa where I remained for about eighteen months, Mr. Geo. Goodwin giving up the work I went to the Montfort Railroad where I had charge of five miles of the work, rock and earth. Receiving a telegram from T. J. Brown, General Manager for the late Andrew Onderdonk requesting me to take charge of Lock 4, Section 5 & 6 of the Soulanges Canal, remaining there until completion about year 1901.

"I then went to Algoma serving eighteen months with Folkey Brothers on the Algoma Railroad. I had charge of ten miles of the work. When this work was finished I was requested by Sam Ritchie of Sydney, Cape Breton, of the Dominion Steel to report as soon as possible as he was about to build coke ovens and railmill. On my arrival they had abandoned the idea of going ahead with this part of the work so made me general foreman of the yard. In about eighteen months time they talked of a 10% decrease in all wages and not seeing my way clear to accept, I returned to my home in Grenville, where I accepted a position as General Superintendent for the late John Ross who was building a small power plant on the Rouge River. From this I went to Chambly on the Richelieu River. Here I had charge of all rock work, working for Mr. Hugh L. Cooper of New York City. When this work was completed I went direct for Mr. Hugh L. Cooper to Niagara Falls, Ont. While there I was Assistant to the General Superintendent of the Forebay and concrete work.

"Before this work was completed I was requested by Mr. Hugh L. Cooper to go to Conowings, Pennsylvania, to look over a quarry site to build the McCalls Ferry Dam about 1906. On the dam I took the position of Assistant Superintendent. In about four months time there was a complete change in the organization and the position of Superintendent was abandoned and I was made General Foreman of all the work. This was a $12,000,000 job.

"Here I made quite a record in building a construction bridge for the dam, consisting of 24 arches of 35 and 40 foot centers and 50 feet wide, carrying 4 standard railroad tracks and one Straddle track for pelicans to work on, doing this in 24 days - an arch a day.

"The Company going into the hands of the receivers I went with the late Beverly R. Value to take charge of Contract 60 on the Barge Canal as General Superintendent remaining there about six months. I then returned to McCall's Ferry to take charge as General Superintendent for the Empire Engineering Company of New York City. There I remained until the finish of the dam.

"By this time I felt I had earned a rest so returned home to Grenville, Que., arriving home about 8 o'clock, and at 11 o'clock that night had a wire from the late Beverly R. Value to report at once to Philadelphia. There I met Mr. Beverly R. Value and Mr. H. S. Kerbaugh, Contractor of New York. I signed a contract there as General Superintendent for the completion of the Kensico Dam, the contract price being $9,000,000. In the month of July, 1914, I placed 86,000 yards of concrete making a worlds record.

"From the Kensico dam I went to Niagara Falls, Ontario, as General Superintendent for the Hydro-Electric Power Commission.

"On practically the completion of this work I left April, 1922 to take charge of the Hill-to-Hill bridge for J. J. Hagerty, Contractor, of New York City, said bridge being situated in Bethlehem, Pa., where I am now located, and not later than this morning I received an offer from Mr. Hugh Nawn, Contractors of Boston, to take charge as General Superintendent of Gilboa Dam, an $8,000,000 job. A copy of their offer you will find enclosed.

Yours very truly,

"Geo. H. Angell".

C O P Y

HUGH NAWN CONTRACTING COMPANY
Engineers - Contractors

BOSTON
Mass.

Gilboa, Dam,
Gilboa, N. Y.,
August 6th, 1922.

George H. Angell, Esq.,
Care of Hodgers & Hagerty, Inc.,
Bethlehem, Pa.

Dear Mr. Angell:-

"My company has the contract for building the Gilboa Dam for the Board of Water Supply of New York City. My father, Harry P. Nawn, was handling this work for our company and unfortunately he was stricken with a shock and passed away

this Spring. His loss has thrown a big responsibility upon me: I have carefully investigated the field, for the best man to assist me in carrying this work through to successful completion.

"I believe that you are the man I want, and I am writing this letter to you, extending the following offer:

1 - Salary, Twenty thousand ($20,000.00) dollars a year.

2 - Bonus, if contract is completed within contract time; Five Thousand dollars for each month within contract time; plant, organization and budget of expenditures to remain as at present, subject to discussion.

3 - Bonus of Profit, above fixed profit estimated.

4 - I will be interested in discussing with you, the proposition of an interest in any of our future work should the above appeal to you.

"Knowing that you are at present employed by Rodgers & Hagerty, Inc., I have written to Mr. J. J. Hagerty, telling him that I am writing you and that I desire to have you come with my company. Will you kindly take this matter up with me at your earliest convenience, since I am desirous of hearing from you.

"With kindest personal regards, I am,"

Very truly yours,

HUGH HAWN CONTRACTING CO.

(signed) Hugh Hawn,
President.

(Extract from a letter written by Mr. Jas. B. Goodwin to Walter J. Francis, under date of August 24, 1922)

"Niagara Falls,
August 24th, 1922.

"He was, as stated, Assistant to the General Superintendent, which was for the Electrical Development Company, an organization for construction of the Development, now the Toronto Power Company Generating Station at the Falls. This employment covered a period from 1903 to late in 1905. From here he went to McCall Ferry and

filled the position as outlined until the company went into the hands of the Receiver in October, 1908. He continued doing certain work for the Receivers until early in 1909.

"From McCall Ferry, Pa., he went to the New York State Barge Canal work (Contract #60) and remained there about six months when he was transferred to McCall Ferry again in the employ of the Empire Engineering Corporation, completing the work, I think, in 1912.

"From that time until April or May, 1917, he had charge of the Kensico Dam at Valhalla for the same interests, under the name of H. S. Kerbaugh, Incorporated.

"Since May, 1917, he has been General Superintendent for the Hydro-Electric Power Commission until April of this year."

COPY

James Bowman Goodwin, B.A.Sc.

Reference Letter on Chart...(1)

Position.....Works Engineer.

Date of Birth.....August 1st, 1867.

Birthplace.....Mono Mills, Ontario.

Education.....Graduate of the University of Toronto, Civil Engineering course, 1892; post-graduate course in Steam and Hydraulic Engineering, degree of B.A.Sc., 1894.

Professional Affiliation...Member, The Engineering Institute of Canada, October 8th, 1907, (Associate Member, April 10th, 1902).

Experience:

1892 - 1893 Assistant Engineer, City of Niagara Falls, New York, including small power development.

1894 - 1896 Rodman and Instrumentman on maintenance of way, L.S. and M.S. Railway, Toledo, Ohio.

1896 - 1897 Assistant Engineer, Niagara Falls, Ontario, sewer system installation.

1897 - 1899 In charge of astronomical and meridian surveys, C.P.R. land grants, British Columbia.

1899 - 1904 Assistant Engineer, Niagara Falls Power Company, Niagara Falls, New York, extension to power house No. 1 and complete station No. 2.

1904 - 1905 Assistant Engineer, Electrical Development Company, Niagara Falls, Ontario, power development of 125,000 H.P.

1905 - 1908 Assistant Engineer and Resident Engineer, McCall Ferry Power Company, McCall Ferry, Pennsylvania, 150,000 H.P. development.

1908 - 1910 Superintendent of Construction, Empire Engineering Corporation, New York State Canal contract, Lockport to Medina, Lockport, New York.

James Bowman Goodwin, B.A.Sc.

(Continued--#2)

Experience (continued):

1910 - 1911 Assistant General Manager and Construction Engineer, Mount Hood Railway, Light and Power Company, steam and water power development, Portland, Oregon.

1911 - 1912 Construction Engineer, Walter J. Francis & Company, Moose Jaw water supply, Moose Jaw, Saskatchewan.

1912 - 1913 Construction Engineer, City of Edmonton, Edmonton, Alberta.

1913 - 1914 Construction Superintendent, Midland Construction Company power development, Healey's Falls, Ontario.

1914 - 1922 Construction Engineer and Works Engineer, Hydro-Electric Power Commission, Niagara Falls, Ontario, Queenston-Chippawa Power Development.

Arthur Clarence Douglas Blanchard, B.Sc.

Reference Letter on Chart...(k).

Position.....Chief Field Engineer.

Date of Birth.....September 18th, 1878.

Birthplace.....Windsor, Nova Scotia.

Education.....King's College University, Windsor, Nova Scotia, and Graduate of McGill University, Montreal, Quebec, Civil Engineering course, degree of B.Sc., 1901.

Professional Affiliations...Member, The Engineering Institute of Canada, December 9th, 1911, (Associate Member, November 17th, 1904), (Member of Council, 1920).
Member, American Society of Civil Engineers, June 24th, 1914.

Experience:

1901 - 1906 Office assistant, instrumentman and later chief of party in charge of construction of wheel-pit, canal and power house, Canadian Niagara Power Co., Niagara Falls, Ontario.

1906 - 1907 Assistant Engineer and later Resident Engineer, in charge of construction West Kootenay Light, Heat and Power Company, Bonnington Falls Development, British Columbia.

1907 - 1911 Assistant Engineer, in charge of special surveys and design and construction of intercepting sewers and sewage disposal works, Toronto, Ontario.

1911 - 1913 City Engineer, Lethbridge, Alberta.

1913 - 1917 Assistant Chief Engineer and Division Engineer, in charge of portion of aqueduct and intake works, Greater Winnipeg Water District, Winnipeg, Manitoba.

1917 to Date Chief Field Engineer, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Francis Way Clark

Reference Letter on Chart...(k-1)

Position.....Division Engineer, (Canal).

Date of Birth.....January 23rd, 1887.

Birthplace.....St. Paul, Minnesota.

Education.....Graduate of the University of Toronto, Civil Engineering course, 1911.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, July 22nd, 1919.

COPY

Experience:

1906 - 1910	Rodman on construction, Canadian Pacific Railway, and Instrumentman on Hydro-Electric Power Commission Transmission Line.
1911 - 1912	Assistant Engineer, International Waterways Commission.
1913 to Date	In the following capacities on the Queenston-Chippawa Power Development of the Hydro-Electric Power Commission --
1913 - 1916	Assistant Engineer on surveys.
1917 - 1919	Assistant Chief Field Engineer.
1919 - 1922	Division Engineer, on Canal construction.
1922 to Date	Division Engineer, on Intake construction.

Walter Jackson, B.A.Sc.

Reference Letter on Chart...(k-2)

Position.....Division Engineer,-(Power House).

Date of Birth.....August 22nd, 1887.

Birthplace.....Buffalo, New York.

Education.....Graduate of the University of Toronto, Civil Engineering course, degree of B.A.Sc., with honours, 1909.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, June 10th, 1913.

Experience:

1907 - Instrumentman, high-tension transmission, Hydro-Electric Power Commission.

1908 - In charge of survey party,-Queen Victoria Niagara Falls Park Commission Boulevard.

1909 - Assistant Engineer, Department of Interior, coal land surveys, Alberta and British Columbia.

1910 - 1914 With the Ontario Power Company, Instrumentman, and later Resident Engineer on power-house extension and No. 2. conduit construction.

1915 - 1916 Resident Engineer and later Assistant Engineer with J. L. Ludlow, consulting engineer, waterworks construction, North Carolina.

1916 - 1919 Resident Engineer, Ontario Power Company, Power-house extension and No. 2. conduit construction, Niagara Falls, Ontario.

1919 - 1922 Division Engineer (Power House), Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Thomas Vincent McCarthy, B.A.Sc.

Reference Letter on Chart...(k-3)

Position ..... Assistant Engineer, in charge of Field Laboratory.

Date of Birth..... July 3rd, 1888.

Birthplace..... Pembroke, Ontario.

Education..... Graduate of the University of Toronto, Civil Engineering course, degree of B.A.Sc., 1913.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, September 23rd, 1919.
Member of American Society of Testing Materials.

Experience:

1906 - 1912 In various capacities on railway maintenance work, (Summers only).

1913 - 1916 Assistant Engineer, Department of Works, City of Toronto, Ontario.

1916 - 1919 Overseas - Canadian Field Artillery.

1919 - 1920 Assistant Laboratory Engineer, Hydro-Electric Power Commission, Niagara Falls, Ontario.

1920 to Date Chief Concrete Inspector and Assistant Engineer, in charge of field laboratory, Queenston-Chippawa Power Development, Niagara Falls, Ontario.

John Whitworth Archer.

Reference Letter on Chart...(1)

Position..... Chief Timekeeper.

Date of Birth..... September 12th, 1879.

Birthplace..... England.

Education ..... High School, Commercial Course.

Experience:

1896 - 1909 Clerk and Assistant Accountant with various companies in England.

1909 - 1915 Clerk, Cost Department, Ontario Power Company, Niagara Falls, Ontario.

1915 - 1916 Clerk, in the Stores Department, American Cyanamide Company, Niagara Falls, Ontario.

1916 - 1917 Timekeeper, Construction Department, Canadian Niagara Power Company, Niagara Falls, Ontario.

1917 to Date Chief Timekeeper, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Rex Phillips Johnson, B.A.Sc.

Reference Letter on Chart...(m)

Position .....Office Engineer.

Date of Birth.....September 24th, 1890.

Birthplace .....Toronto, Ontario.

Education.....Graduate of the University of Toronto, Civil Engineering course, degree of B.A.Sc., with honours, 1914.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, July 22nd, 1919.

Experience:

1909 - 1911	Rodman and Chainman on railroad location and construction, (Summers only).
1912,	Transitman on electric railroad location, (Summers only).
1913,	Draftsman and Transitman on Welland Canal maintenance, (Summers only).
1914 - 1916	Designing Draftsman on Welland Ship Canal, St. Catharines, Ontario, employed directly under the Designing Engineer on the design of locks, bridges, weirs, dams and hydraulic calculations.
1916 - 1919	Senior Draftsman and Assistant Office Engineer, Hydro-Electric Power Commission, Queenston-Chippawa Power Development, Niagara Falls, Ontario.
1919 - 1922	Office Engineer, Hydro-Electric Power Commission, Queenston-Chippawa Power Development, Niagara Falls, Ontario.
At present	Efficiency Engineer, Forest Products Engineering Co., Chicago, Illinois.

Frank Ferby Cooper

Reference Letter on Chart...(n).

Position .....Chief Clerk.

Date of Birth.....April, 1880.

Birthplace.....St. Catharines, Ontario.

Education.....Public School, Collegiate Institute, Business College.

Professional Affiliations...Member, Canadian Society of Cost Accountants.

Experience:

1903 - 1905 Chief Field Clerk and Accountant, Toronto Power Co., Niagara Falls, Ontario.

1905 - 1908 Chief Timekeeper and Field Accountant, McCall's Ferry Power Company, McCall's Ferry, Pennsylvania.

1909 - 1910 Storekeeper, New York State Barge Canal, Empire Engineering Corporation, Gaspoit, New York.

1910 - 1913 Chief Payroll and Distribution Clerk, Mississippi River Power Company, Keokuk, Ohio.

1913 - 1914 Chief Field Accountant, Healy Falls Power Development, Midland Construction Company, Campbellford, Ontario.

1915 - 1916 Cost Clerk, Toronto Union Station, Peter Lyall & Sons Construction Company, Toronto, Ontario.

1916 - 1917 Chief Field Accountant, Union Manufacturing and Power Company, Union, South Carolina.

1917 - 1922 Chief Clerk, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Arthur George Bradley

Reference Letter on Chart...(n-1)

Position..... Cost Clerk.

Date of Birth..... July, 1879.

Birthplace..... St. Catharines, Ontario.

Education..... High School and Business College.

Experience:

1903 - 1905 Timekeeper and cost clerk with H. D. Symmes, Ontario Power Company Construction, Niagara Falls, New York.

1906 - 1907 Cost clerk and timekeeper, Ohio River Slack Water System, Pittsburgh, Pennsylvania.

1907 - 1908 In charge of Local Office, Port Credit Brick Company.

1908 - 1909 Plant Superintendent for M. J. Haney, Port Credit Brick Company.

1909 - 1910 Construction and Manufacturing Superintendent, Pitt Lake Brick and Cement Company, British Columbia.

1910 - 1912 Assistant walking boss, Cleveland Brothers, Erie Canal Construction.

1912 - 1913 Manager, Lincoln Clay Products, St. Catharines, Ontario.

1914 - 1917 Cost Clerk, Welland Ship Canal, St. Catharines, Ontario.

1917 to Date Cost Clerk, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Seger Winslow Johnston

Reference Letter on Chart...(c)

Position .....Right-of-Way Engineer.

Date of Birth .....May 4th, 1886.

Birthplace.....Scarboro, Ontario.

Education.....International Correspondence Schools, Scranton, Pennsylvania.

Professional Affiliations...Associate Member, The Engineering Institute of Canada, October 28th, 1919.

Experience:

1907 - 1913 Chainman on high tension power line construction, Hydro-Electric Power Commission.

1913 - 1914 Instrumentman with the Hydro-Electric Power Commission.

1914 - 1921 In charge of field party on Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

1921 - 1922 Right-of-way Engineer on Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Harvey Channel Anderson

Reference letter on Chart...(p)

Position ..... Superintendent, Division No. 1.

Date of Birth ..... April 30th, 1885.

Birthplace ..... Delta, Pennsylvania.

Education .....High School.

Experience:

1905 -	On cable ways and grain elevators for John H. Anderson, General Contractor.
1905 - 1908	Carpenter Foreman, McCall's Ferry Power Plant.
1908 - 1910	General Foreman, on dam construction for General Electric Co., at Schenectady, New York.
1910 - 1911	Assistant Superintendent, Empire Engineering Company, State Barge Canal, New York.
1911 - 1918	Division Superintendent, for H. S. Kerbaugh & Company, Valhalla, New York.
1918 to Date	Superintendent, Division No. 1, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Carter Dam, Arizona

Reference Information Sheet (1)

Location: ..... Gunnison County, Colorado No. 1.

Type of Dam: ..... earth fill, 1944.

Elevation: ..... Dolan, Colorado.

Contractor: ..... Dolan Bros.

Contractors:

1907 - [illegible] to parts were [illegible] structures for Plan B. Reservoir Survey [illegible].

1907 - 1911 Gunnison Project, Dolan's Pass Dam Cost.

1909 - 1910 General Foreman, on dam construction for General [illegible] [illegible], Mr. Schmeckbeck, Mr. Tyson.

1910 - 1911 Laborers Superintendent. Twelve Apostles Tunnel, Pecos River Tunnel, New York.

1911 - 1918 Private Consultantship. For A. C. Cummins & Company, Tunnels, New York.

1918 to Date Superintendent, Steven A. C. Cummins-Stillman Dam Construction, Eagle-Tigers, Cow Springs, Oklahoma, Oregon Dam, Idaho.

Frederick William Scriven

Reference Letter on Chart...(q).

Position ..... Superintendent, Divisions Nos. 2 and 3.

Date of Birth..... October 25th, 1880.

Birthplace ..... Sydenham, Ontario.

Education ..... High School.

Experience:

1900 - 1903	Mica Mining for 3 years in County of Frontenac.
1903 - 1906	On construction of Temiskaming and Northern Ontario Railway.
1907 - 1908	Prospecting at Cobalt, Ontario.
1908 - 1909	Mine Owner and Operator, County of Frontenac.
1910 - 1912	Built 25 Units of Canadian Northern Railway, as Contractor.
1913 - 1914	Built 6 miles of Lake Erie & Northern Railway, as Contractor.
1914 - 1915	On construction of Eugenia Falls Power Plant.
1916	Built plant for Dominion Steel Products Company at Brantford, Ontario, as Contractor.
1917 - 1922	Superintendent, Divisions Nos. 2 and 3, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.
1922 to Date	General Superintendent, Castellani Construction Co., on the construction of the Intake for the Queenston-Chippawa Power Development.

[illegible]

[illegible]

[illegible] ..... Sparrowhawk, Tiviliaro Nos. 2 and 3.

[illegible] ..... Thomas, [illegible].

[illegible] ..... Hydebank, Cathcart.

[illegible] ..... High School.

Buildings.

1900 - 1903	Sun Living [illegible] Company [illegible].
1902 - 1904	Re-construction of Tanlaghmanling and Northern Central Railway.
1907 - 1909	Prospecting in Canada, Canada.
1908 - 1909	Film Camera and Cinematic Trade of Processes.
1910 - 1912	Walls for Baking of [illegible] Carriage Factory, [illegible].
1912 - 1914	Built 2 miles of [illegible] Railway, [illegible].
1913 - 1917	The Construction of Angola Falls Power Plant.
1914	Built plant for [illegible] Vital [illegible] Company, [illegible], [illegible].
1917 - 1922	Sparrowhawk, Tiviliaro Nos. 2 and 3. [illegible] Hydebank, Cross-Roads Sparrowhawk, Thomas Villa, [illegible].
1922 to date	Samuel Hyde[illegible], Cathcart Construction Co., in [illegible] of the Jubilee for the [illegible] Development.

William Lindsay LeRoy

Reference Letter on Chart...(r)

Position..... Superintendent, Power House Division.

Date of Birth..... April 23rd, 1871.

Birthplace..... Bryson, Quebec.

Education..... Quebec Model School.

Experience:

1901 - 1909 Foreman and Assistant Superintendent on various work including foundations for a Power House at Shawinigan Falls; concrete Dam and Power House at Lac du Bonnett, Manitoba; construction work at Maisonneuve; Dams and Power House for Schenectady Power Company, at Schaghticoke and at Johnsonville, New York; and Dam and Power House foundations at Montreal River, Quebec.

1910 - 1915 With various contractors on dam and power house construction in capacities such as superintendent, assistant superintendent and chief inspector.

1916 - 1918 Superintending the erection of various buildings at Newark, New Jersey, Trenton, Ontario, and St. John, New Brunswick.

1918 - 1919 With the United States Shipping Board at Jacksonville, Florida, on logging operations and ship-building, also Yard Superintendent on munition plant at Newark, New Jersey.

1919 to Date Superintendent of Power House Division on the Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

Harold Langmuir Bucke, Grad. R.M.C.

Reference Letter on Chart...(s)

Position.....Superintendent of Construction Railway.

Date of Birth ..... August 24th, 1879.

Birthplace .....London, Ontario.

Education .....Graduate of the Royal Military College of Canada, 1900.

Professional Affiliations....Member, The Engineering Institute of Canada, June 22nd, 1912 (Associate Member, November 17th, 1904).

Experience:

1900 - 1901 Leveller, with Lindsay, Bobcaygeon and Pontypool Railway.

1901 - Five months, assistant engineer, Hydrographic Survey, Lake Nipissing and French River.

1902 - 1903 Instrumentman and Resident Engineer in charge construction reservoir, dam, pipe line, etc., Sydney, C.B., water supply.

1903 - 1913 Five months, Locating Engineer Trans-Canada Railway, north of Lake Winnipeg; nineteen months, Assistant Engineer Grand Trunk Pacific Railway, Thunder Bay Branch. Three years, Locating Engineer Trans-Continental Railway; five years, Division Engineer on construction Trans-Continental Railway, Lake Nipigon to Winnipeg.

1913 to Date With Hydro-Electric Power Commission of Ontario. Three and one-half years, Assistant Engineer, Radial Railways; five and one-half years, Superintendent railway construction and maintenance Queenston-Chippawa Power Development; at present Superintendent, in charge of Divisions Nos. 1, 2 and 3, Queenston-Chippawa Power Development, Niagara Falls, Ontario.

Rufus Taylor Gent

Reference Letter on Chart...(t)

Position ..... Plant Engineer.

Date of Birth ..... April 6th, 1879.

Birthplace..... Rockford, Illinois.

Education..... High School.

Professional Affiliations...Member, The Engineering Institute of Canada, April 27th, 1920.
Member, American Institute of Electrical Engineers, 1920.
Member, The American Society of Mechanical Engineers, 1921.

Experience:

1897 - 1901 Apprentice in various electric manufacturing concerns.

1901 - 1904 Master Mechanic and Chief Electrician for National Construction Company, on Power Development Contracts, Niagara Falls, New York.

1905 - 1906 Foreman in charge of switchboard erection, Westinghouse Company.

1906 - 1908 Erecting Foreman for General Electrical Company, New York City.

1908 - 1912 Plant Engineer, United Engineering Company, New York City.

1912 - 1913 Mechanical and Electrical Superintendent, Engineering and Contracting Company, Havana, Cuba.

1913 - 1917 Plant Engineer, Mount Royal Tunnel, Montreal, Quebec.

1917 - 1921 Plant Engineer on Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, New York.

1921 to Date General Superintendent, New York Trap Rock Corporation, Peekskill, New York.

[illegible]

[illegible]

Position ..... Plant Engineer.

Date of Birth ..... [illegible] 1878.

Birthplace ..... Hartford, Illinois.

Education ..... High School.

Professional Affiliations ... Member, The Engineering Institute of Canada, April 5th, 1920.
Member, American Institute of Electrical Engineers, 1920.
Member, Association of Municipal Electrical Engineers, 1920.

Experience:

1907 - 1921 Apprentice in various electrical [illegible].

1921 - 1924 [illegible] Chief Construction for National Construction Company, on Power Development Contracts, Niagara Falls, New York.

1924 - 1926 [illegible] at [illegible] [illegible].

1926 - 1928 Assisting Planner for Hamond Electrical Company, New York City.

1928 - 1932 Plant Engineer, Sterling Engineers - Toronto, Ont. Toronto.

1932 - 1937 Designing and Electrical Specifications, Engineers and Contractors Inc Company, Havana, Cuba.

1938 - 1937 Plant Engineer, Bond Paper Mills, Montreal, Quebec.

1937 - 1941 Plant Engineer [illegible] Power Development, Niagara Mohawk Power Corporation, Niagara Falls, New York.

1941 to Date Assistant Superintendent, New York Power Main Corporation, Poughkeepsie, New York.

John Theodore Nablo

Reference Letter on Chart...(t-1)

Position ..... Chief Electrician.

Date of Birth..... 1879.

Birthplace..... Fisherville, Ontario.

Education..... Common School.

Experience:

3 Years	Electrician on the construction of the Canadian Niagara Power Company.
1 Year	Electrician on the construction of the Niagara, Lockport and Ontario Power Company.
3 Years	Foreman on maintenance with the Niagara, Lockport and Ontario Power Company.
4 Years	Chief Electrician, Erie Canal.
2 Years	Construction Foreman with the Niagara, Lockport and Ontario Power Company.
1917 to Date	Chief Electrician, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

John Cameron Lane

Schedule Taken on Page ...1...

Position ..... Chief Electrician.

Date of Birth ..... 1899.

Attendance ..... Fairbrothy Street.

Education ..... Common School.

Qualifications:

7 Years	Electrician [illegible] of the Canadian Niagara Power Company.
1 Year	Electrician on the construction of the Niagara, Lockport and Ontario Power Company.
3 Years	Electrician maintenance with the Niagara, Lockport and Ontario Power Company.
6 Years	Chief Electrician, Welland Canal.
2 Years	Electrician-foreman with the Niagara, Lockport and Ontario Power Company.
1917 to Date	Chief Electrician, Hydro-Electric Power Commission, Ontario. Electric Power Installation, Queens Falls, Ontario.

Samuel Warren Andrews, M.E.

Reference Letter on Chart...(t-2)

Position ..... Assistant Plant Engineer.

Date of Birth ..... September 24th, 1890.

Birthplace .....Lead, South Dakota.

Education.....Graduate of Cornell University, Mechanical Engineering course, degree of M.E., 1912.

Experience:

1912 - 1913 Draftsman with Portland Railway, Light & Power Company, Portland, Oregon.

1913 - 1914 Electrician, on Sub-station Construction, Portland, Eugene & Eastern Electrification (Southern Pacific Company), in charge of erection of motor generator sets.

1914 - 1915 Sub-station Operation and Inspector of overhead construction and Draftsman in connection with line work, Southern Pacific Company.

1915 - 1916 Valuation Inspector, Inspection and working up unit costs for valuation of all electrical properties - Northern Electric Railway, Sacramento, California.

1916 - 1917 On design, estimates and field work in connection with extension of Southern Pacific Company's Transmission Line.

1917 - 1918 Assistant Engineer, General Engineering and Transmission Department, Hydro-Electric Power Commission, Toronto, Ontario. Work consisted of investigations, transmission line design, valuations and general engineering for municipalities on work orders.

1918 - 1921 Assistant Plant Engineer, Hydro-Electric Power Commission, Queenston-Chippawa Power Development, Niagara Falls, Ontario.

1921 to Date Plant Engineer, Hydro-Electric Power Commission, Queenston-Chippawa Power Development, Niagara Falls, Ontario.

Joseph Smith Anderson, Jr.

Personal Data - (2-2)

Position ..... Assistant Plant Engineer.

Date of Birth ..... September 27th, 1887.

Birthplace ..... Lewis, New York.

Education.....Graduate of Cornell University, Mechanical Engineering course, degree of M.E., 1912.

Experience

1912 - 1913 Instructor at Cornell University, Dept. of Power Engineering, Ithaca, New York.

1913 - 1914 Electrician, in Sub-station Construction, Ithaca, Ohio, Lake Erie Electric Railroad Company; in charge of erection of motor generator sets.

1914 - 1916 Sub-station Operator and Inspector of electric transformation and Transmission in connection with line work, Southern Pacific Company, Sacramento, California.

1916 - 1918 Technical Engineer, Interpreting and analyzing data for valuation of all industrial properties - Southern Electric Railway, Sacramento, California.

1918 - 1917 On design, estimates and field work in connection with extension of Southern Pacific Company's Transmission line.

1917 - 1919 Assistant Engineer, General Engineering and Transmission Department, Pacific-Electric Power Consolidation, Tacoma, Washington. Work consisted of investigations, transmission line design, estimates and general engineering for municipalities on work orders.

1919 - 1921 Assistant Plant Engineer, Pacific-Electric Power Consolidation, Sacramento-Stockton Power Development, Stockton Office, Cascade.

1921 to Date Plant Engineer, Pacific-Electric Power Consolidation, Sacramento-Stockton Power Development, Electric Office, Stockton.

Peter Ramsey Reid

Reference Letter on Chart...(u)

Position ..... Master Mechanic.

Date of Birth ..... 1870.

Birthplace.....Dundee, Scotland.

Education..... Common School, Ottawa, Ontario.

Experience:

1901 - 1905 Charge of Cableways - Hudson River Power & Light Company, Glen Falls, New York.

1906 - 1910 Master Mechanic - McCall's Ferry Power Company, McCall's Ferry, Lancaster County, Pennsylvania.

1910 - 1919 Master Mechanic - The J. G. White Engineering Corporation, New York City.

1919 to Date Master Mechanic, Queenston-Chippawa Power Development, Hydro-Electric Power Commission, Niagara Falls, Ontario.

[illegible]

[illegible]

[illegible]

Position ..... Master Mechanic.

Date of Birth ..... 1870.

Nationality.....Canadian. Scotland.

Education..... Gordon School, Ottawa, Ontario.

Experience:

1901 - 1903 [illegible] Power & Light Company, Niagara Falls, New York.

1903 - 1910 Niagara Falls - Buffalo Power Transmission, Metallic Power Laboratory Tests, Transformers.

1910 - 1914 Niagara Falls - The G. G. White Engineering Corporation, New York City.

1914 to Date Master Mechanic, Ontario-Quebec Power Development, Electric Power Generation, Ottawa Valley.

Remuneration.

Mr. Landis has examined the books and the records of the Accounting Department, and has obtained for us detailed information regarding the salaries of the principal officers, staff members and assistants of the Queenston-Chippawa Power Development. He has ascertained the annual salary paid, and the proportion thereof applicable to the Queenston-Chippawa Power Development in every case. He reports that he has made extensive test checks by comparison with original records to afford assurance as to the accuracy of the amount of the remuneration and of its distribution, and that he is quite satisfied in regard to the records.

The above mentioned information has been compiled into the table included herewith as page F-69. The annual salaries are also depicted in graphical form on the three charts included herewith as pages F-70, F-71 and F-72.

In the case of the Chief Engineer, the Laboratory Engineer, the Purchasing Agent, the Engineer in charge of Employees' Relations, and the Assistant Engineer, in charge of the Field Laboratory, the salaries are charged directly to the overhead operating expenses of the Hydro-Electric Power Commission, and it is not possible to obtain readily a sub-division chargeable to the Queenston-Chippawa Power Development.

In the table referred to above, the position and its occupant are given as during the year 1921. In some cases, however, notably that of the Personal Assistant to the Chief Hydraulic Engineer, the Division Engineer for the Canal, the Office Engineer, and the Right-of-Way Engineer, the occupants of these positions were working in junior capacities at the commencement of the work and were subsequently promoted.

(a) - Part time only.
(b) - Part year only.

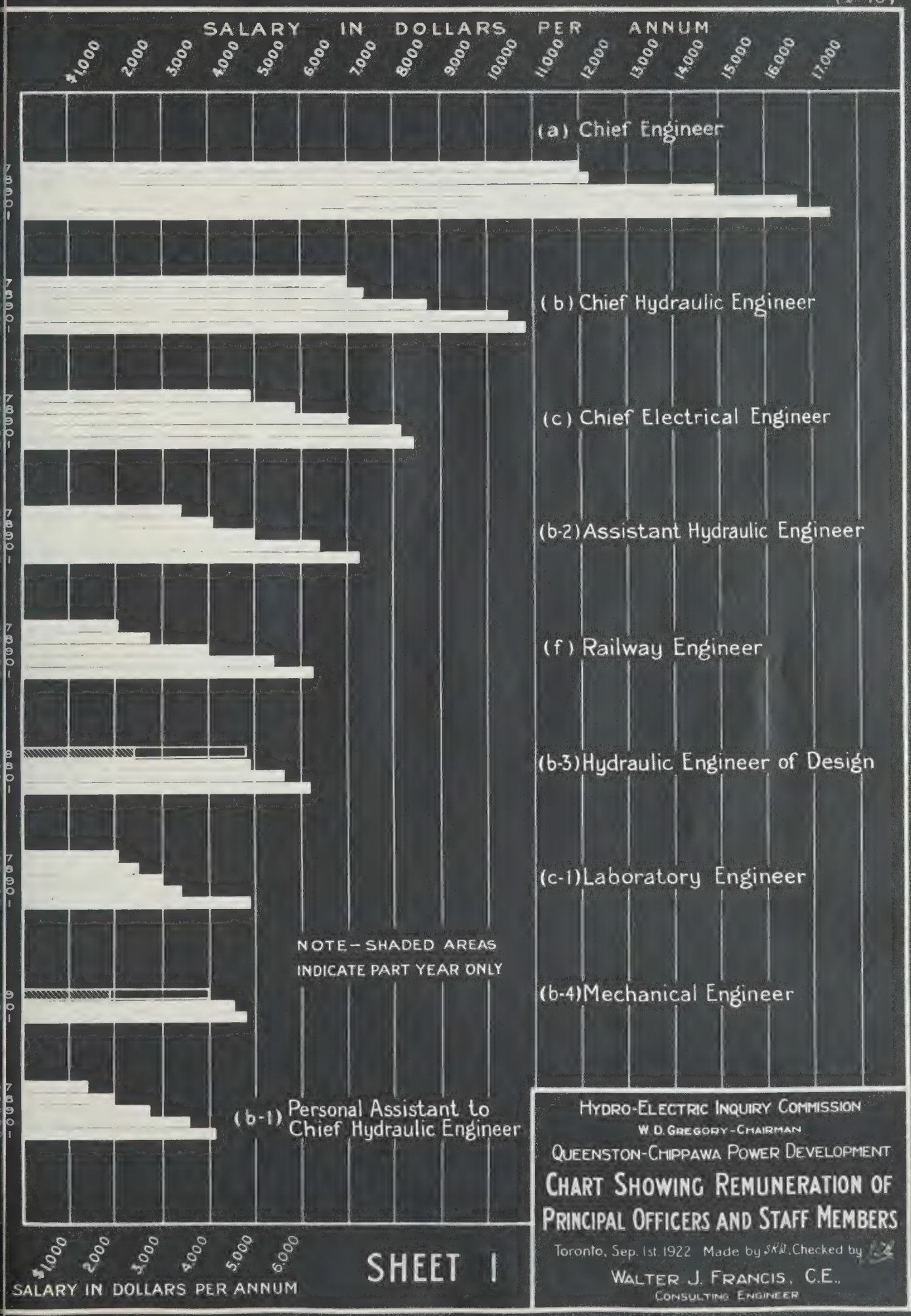
REMUNERATION OF STA

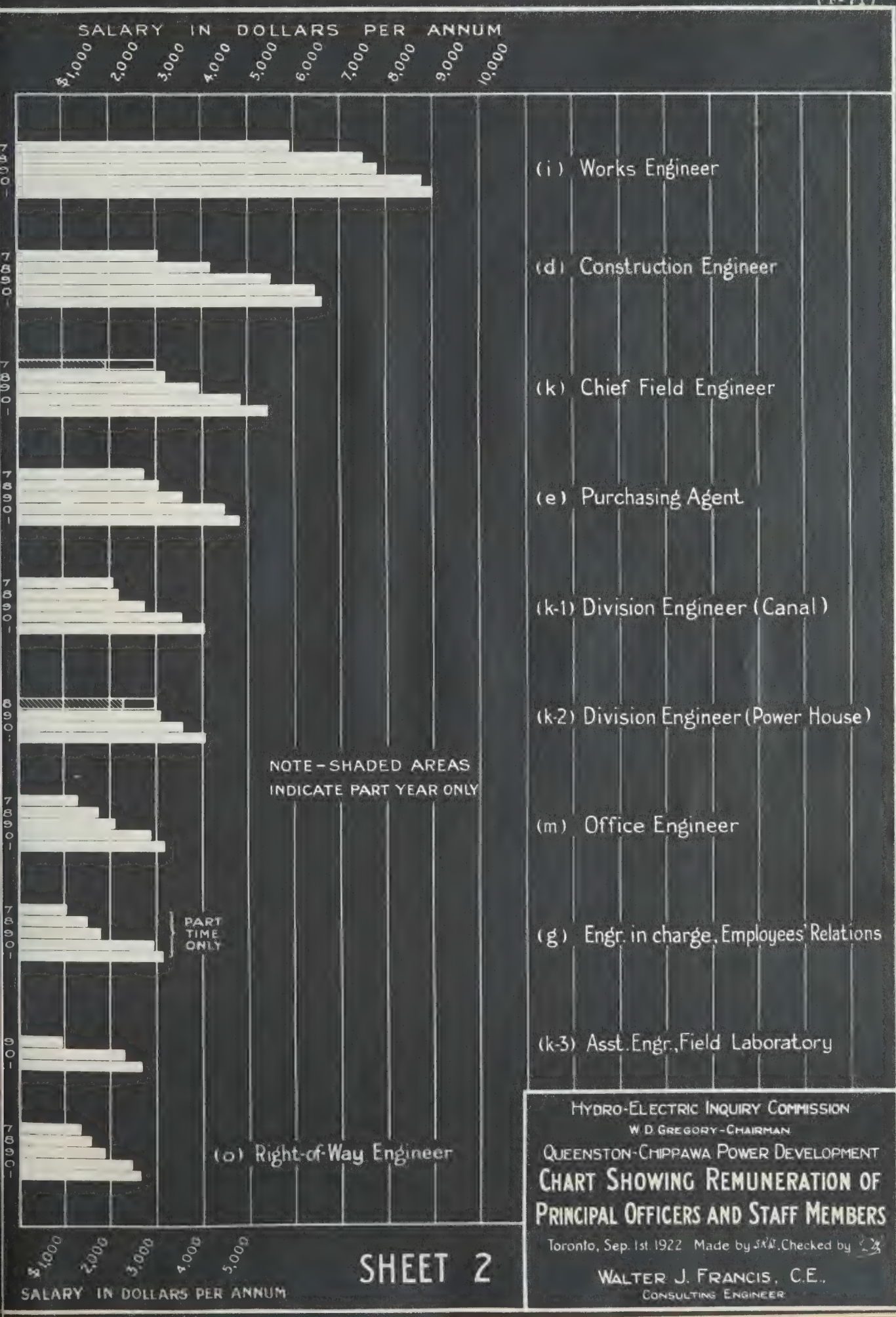
Reference Letter on Chart	Position	Occupant	Year Ending October 31st, 191 Salary	Chippawa Proportion
			$	$
a	Chief Engineer	F. A. Gaby	12,000	-
b	Chief Hydraulic Engineer	H. G. Acres	7,000	3,432
b-1	Personal Asst. to Chief Hydr. Engr.	R. L. Hearn	1,400	994
b-2	Asst. Hydraulic Engineer	T. H. Hogg	3,400	849
b-3	Hydraulic Engineer of Design	M. V. Sauer	-	-
b-4	Mechanical Engineer	A. Aeberli	-	-
c	Chief Electrical Engineer	E. T. J. Brandon	4,950	267
c-1	Laboratory Engineer	W. P. Dobson	2,075	-
d	Construction Engineer	A. V. Trimble	3,025	68
e	Purchasing Agent	B. O. Salter	2,750	-
f	Railway Engineer	T. U. Fairlie	2,025	575
g	Engr. in charge, Employees' Relations	W. Maclachlan	1,044a	-
h	Superintendent of Construction	G. H. Angell	5,400	5,400
i	Works Engineer	J. B. Goodwin	5,920	5,872
k	Chief Field Engineer	A. C. D. Blanchard	1,951b	1,951
k-1	Division Engineer (Canal)	F. W. Clark	2,060	2,060
k-2	Division Engineer (Power House)	W. Jackson	-	-
k-3	Asst. Engr. Field Laboratory	T. V. McCarthy	-	-
l	Timekeeper	W. J. Archer	612b	612
m	Office Engineer	R. P. Johnson	1,287	1,287
n	Chief Clerk	F. F. Cooper	1,819	1,819
n-1	Cost Clerk	A. G. Bradley	1,514	1,514
o	Right-of-Way Engineer	S. W. Johnston	1,335	1,274
p	Superintendent, Division No. 1	C. Anderson	-	-
q	Superintendent, Divisions Nos. 2 and 3	F. W. Scriven	2,175	2,175
r	Superintendent, Power House	W. L. LeRoy	-	-
s	Superintendent, Railway	H. L. Bucke	2,675	2,475
t	Plant Engineer	R. T. Gent	1,800b	1,800
t-1	Chief Electrician	J. T. Nablo	-	-
t-2	Assistant Plant Engineer	S. W. Andrews	810b	310
u	Master Mechanic	P. R. Reid	-	-

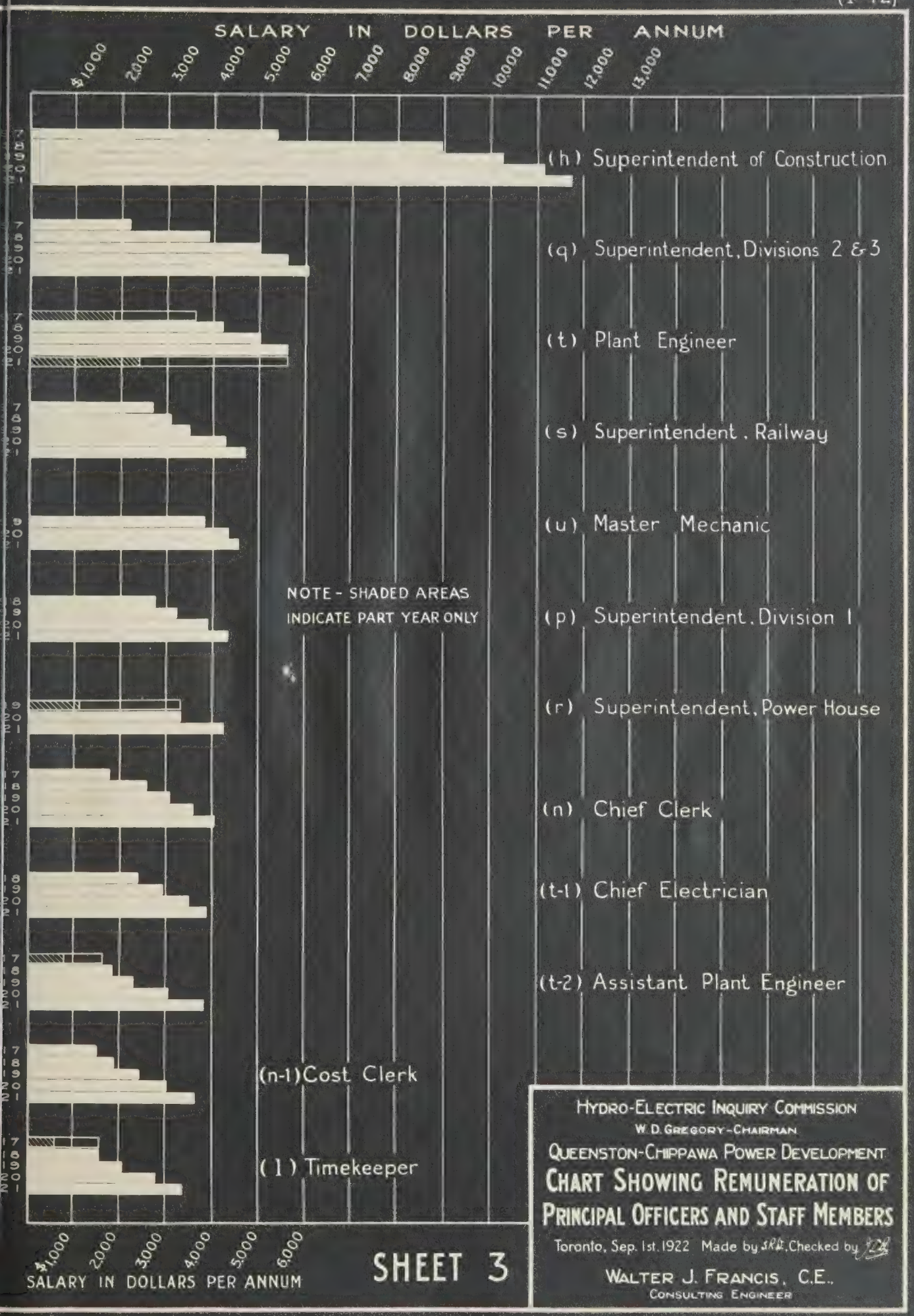
(a) - Part time only.
(b) - Part year only.

QUEENSTON-CHIPPAWA POWER DEVELOPMENT.

Year Ending October 31st, 1918		Year Ending October 31st, 1919		Year Ending October 31st, 1920		Year Ending October 31st, 1921	
Salary	Chippawa Proportion	Salary	Chippawa Proportion	Salary	Chippawa Proportion	Salary	Chippawa Proportion
$	$	$	$	$	$	$	$
12,200	-	14,932	-	16,698	-	17,400	-
7,350	2,620	8,735	3,257	10,466	5,995	10,800	8,800
2,000	735	2,740	1,479	3,580	3,193	4,130	4,130
4,100	925	5,000	1,127	6,400	2,076	7,250	3,725
2,400b	816	4,900	1,675	5,625	3,017	6,200	4,211
-	-	1,887b	422	4,550	621	4,800	1,460
5,850	1,160	7,000	2,150	8,150	877	8,400	-
2,500	-	3,000	-	3,400	-	4,860	-
4,200	191	5,500	11	6,475	42	6,600	-
3,050	-	3,600	-	4,500	-	4,800	-
2,750	1,815	4,000	1,692	5,400	855	6,250	825
1,500a	-	1,800a	[illegible]	1,945a	-	3,120a	1,183
8,958	8,958	10,266	10,266	11,150	11,150	11,750	11,750
7,500	7,500	7,800	7,800	8,750	8,750	9,000	9,000
3,200	3,200	3,950	3,950	4,850	4,850	5,450	5,450
2,175	2,175	2,750	2,750	3,580	3,580	4,025	4,025
2,302b	175	3,100	993	3,580	3,563	4,025	4,025
-	-	991	-	2,275	-	2,650	-
1,590	1,590	2,080	2,080	2,800	2,800	3,350	3,350
1,725	1,725	2,100	2,100	2,875	2,875	3,175	3,175
2,600	2,600	3,100	3,100	3,580	3,580	4,025	4,025
1,900	1,900	2,425	2,425	3,050	3,050	3,650	3,650
1,545	1,545	1,890	1,890	2,420	2,420	2,625	2,625
2,750	2,750	3,200	2,900	3,915	3,915	4,350	4,350
3,900	3,900	5,000	5,000	5,575	5,575	6,050	6,050
-	-	1,100b	1,100	3,300	3,300	4,250	2,550
3,075	3,075	3,500	3,500	4,250	4,250	4,675	4,675
4,200	4,200	5,000	5,000	5,575	5,575	2,375b	2,375
2,380	2,380	2,976	2,976	3,500	3,500	3,900	3,900
1,885	1,300	2,300	2,300	3,050	3,050	3,825	3,825
-	-	3,853	3,853	4,350	4,350	4,560	4,560


SALARY IN DOLLARS PER ANNUM
$1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
14,000
15,000
16,000
17,000
(a) Chief Engineer
(b) Chief Hydraulic Engineer
(c) Chief Electrical Engineer
(b-2) Assistant Hydraulic Engineer
(f) Railway Engineer
(b-3) Hydraulic Engineer of Design
(c-1) Laboratory Engineer
(b-4) Mechanical Engineer
(b-1) Personal Assistant to Chief Hydraulic Engineer
NOTE – SHADED AREAS INDICATE PART YEAR ONLY
$1,000
2,000
3,000
4,000
5,000
6,000
SALARY IN DOLLARS PER ANNUM
SHEET I
HYDRO-ELECTRIC INQUIRY COMMISSION
W. D. GREGORY - CHAIRMAN
QUEENSTON-CHIPPAWA POWER DEVELOPMENT
CHART SHOWING REMUNERATION OF PRINCIPAL OFFICERS AND STAFF MEMBERS
Toronto, Sep. 1st. 1922 Made by SKD. Checked by
WALTER J. FRANCIS, C.E.,
CONSULTING ENGINEER


SALARY IN DOLLARS PER ANNUM
$1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
(i) Works Engineer
(d) Construction Engineer
(k) Chief Field Engineer
(e) Purchasing Agent
(k-1) Division Engineer (Canal)
(k-2) Division Engineer (Power House)
(m) Office Engineer
(g) Engr. in charge, Employees' Relations
(k-3) Asst. Engr., Field Laboratory
(o) Right-of-Way Engineer
NOTE - SHADED AREAS INDICATE PART YEAR ONLY
PART TIME ONLY
SALARY IN DOLLARS PER ANNUM
SHEET 2
HYDRO-ELECTRIC INQUIRY COMMISSION
W. D. GREGORY - CHAIRMAN
QUEENSTON-CHIPPAWA POWER DEVELOPMENT
CHART SHOWING REMUNERATION OF PRINCIPAL OFFICERS AND STAFF MEMBERS
Toronto, Sep. 1st. 1922 Made by S.N.W. Checked by
WALTER J. FRANCIS, C.E.
CONSULTING ENGINEER


SALARY IN DOLLARS PER ANNUM
$1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
12,000
13,000
(h) Superintendent of Construction
(q) Superintendent, Divisions 2 & 3
(t) Plant Engineer
(s) Superintendent, Railway
(u) Master Mechanic
(p) Superintendent, Division 1
(r) Superintendent, Power House
(n) Chief Clerk
(t-1) Chief Electrician
(t-2) Assistant Plant Engineer
(n-1) Cost Clerk
(1) Timekeeper
NOTE - SHADED AREAS INDICATE PART YEAR ONLY
$1,000
2,000
3,000
4,000
5,000
6,000
SALARY IN DOLLARS PER ANNUM
SHEET 3
HYDRO-ELECTRIC INQUIRY COMMISSION
W. D. GREGORY - CHAIRMAN
QUEENSTON-CHIPPAWA POWER DEVELOPMENT
CHART SHOWING REMUNERATION OF PRINCIPAL OFFICERS AND STAFF MEMBERS
Toronto, Sep. 1st. 1922 Made by S.R.A. Checked by
WALTER J. FRANCIS, C.E.
CONSULTING ENGINEER

For convenience of reference and comparison, the charts already referred to have been prepared. They show the salaries paid for the five fiscal years, 1917 to 1921 inclusive, and in order to simplify the presentation they have been divided into three groups. By studying the charts in conjunction with the table on page F-69, the periods worked by each officer and the distribution of his salary may be readily ascertained.

Co-operation.

In the preparation of the charts an effort was made to represent, by means of dotted lines, the channels along which direct co-operation was not only intended but actually used during the construction work; but the idea had to be abandoned because of the multiplicity of lines involved. Speaking in the broadest way, the lines on the diagram may be said to represent the channels of direct authority and responsibility.

The conduct of the work naturally required co-operation by all concerned, the more so on account of the urgency demanded by the Hydro-Electric Power Commission. That such co-operation existed throughout has been indicated to me not only by the principal members of the organization, but also by numerous documents, plans and details that could not have been expeditiously done in any other way. On the other hand, the duties of the principal officers were so heavy as to leave little spare time for anything beyond their immediate departments.

I have searched and inquired diligently, and I have satisfied myself that all the principal officers endeavored to discharge their duties in the interest of their

For convenience of reference and comparison, the charts already referred to have been prepared. They show the salvoes paid for the five fiscal years, 1917 to 1921 inclusive, and in order to simplify the presentation they have been divided into five periods. In addition the charts include the information with regard to page 7-22, the periods marked by each officer and the distribution of his salary and be monthly accounted.

Conclusion

In the Preliminary of the charts of fiscal and work - expenses, expenses of making items, the charges relating with investigation-operation was not only intended of the activity from during the examination only, as the time had to be measured because of the multiplicity of items involved. Besides, in the personal act, the time of the photos was so hard to remember the numbers of actual expenses and responsibilities.

The conduct of this work naturally required co-operation by all concerned, the same as an example of the general principle of the Co-operation. Thus Canada. That such co-operation existed throughout has been indicated to me not only by the pecuniary members of the general staff, but also by numerous department, plans and details that could not have been unconditionally done in any other way. On the other hand, the duties of the principal officers were so heavy as to leave little spare time for detailed second that their functions involved.

I have searched and inquired diligently, and I have satisfied myself that all the principal officers concerned in Canada Work were in the Government or have the

several departments. To illustrate my point, one of the most difficult and annoying incidents on any construction work is the keeping of line and level marks. In this case I have learned that while the Construction Department did not spend any undue time in endeavoring to preserve the lines and levels given them, nevertheless the Engineering Department experienced the usual difficulties in having them kept.

Speaking generally, it was necessary for the principal heads, for example, Mr. Acres and Mr. Brandon, to confer, in order that plans prepared under their direction in their departments might be so co-ordinated as to be in proper form when presented to Mr. Gaby for his consideration and approval, in the carrying out of a specific general order by him.

In the up-building of the organization, many of the engineers carried on their tasks until they were no longer able to do so, by which time new branches were created. Similarly, when the completion approached, numbers resigned or were laid off, and as far as necessary their uncompleted tasks were assumed by those who remained. The principal offices, however, have remained substantially as they were organized at the beginning, and they are occupied by the same persons.

Consulting Engineer.

Toronto, September 6th, 1922.